BALDOR®

Towable Generators
(Trailer and Skid Mounted)

(Diesel Liquid Cooled)

TS25, 45, 80, 130 and 175

Installation & Operating Manual

5/05 **MN2416**

WARNING:
CALIFORNIA PROPOSITION 65 WARNING:

Engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

WARNING:
CALIFORNIA PROPOSITION 65 WARNING:

Battery posts, terminals and related accessories are known to the state of California to cause cancer, birth defects and other reproductive harm.

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Section 1
Product Safety Information

Safety Notice

Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury. Always disconnect all electrical loads before starting the generator.

Installation and repair procedures require specialized skills with electrical generating equipment and liquid cooled engine systems. Any person that installs or repairs this generator must have these specialized skills to ensure that this generating unit is safe to operate. Contact Baldor service department for repairs or any questions you may have about the safe installation and operation of this system.

The precaution statements are general guidelines for the safe use and operation of this generator. It is not practical to list all unsafe conditions. Therefore, if you use a procedure that is not recommended in this manual you must determine if it is safe for the operator and all personnel in the proximity to the generator and connected loads. If there is any question of the safety of a procedure please contact Baldor before starting or stopping the generator.

This equipment contains high voltages. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start−up procedure or troubleshoot this equipment.

This equipment may be connected to other machines that have rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start−up procedure or troubleshoot this equipment.

- System documentation must be available to anyone that operates this equipment at all times.
- Keep non-qualified personnel at a safe distance from this equipment.
- Only qualified personnel familiar with the safe installation, operation and maintenance of this device should attempt start-up or operating procedures.
- Always stop engine before making or removing any connections.
- Always stop engine and allow it to cool before refueling.

Responsibility

When your generator is delivered, it becomes the responsibility of the owner/operator of the generator set to prevent unsafe conditions and operation of the equipment. Some responsibilities include (but are not limited to) the following:

1. It is the responsibility of the owner/operator of this generator to ensure that this equipment is correctly and safely installed.
2. It is the responsibility of the owner/operator of this generator to ensure that this equipment, when installed fully complies with all federal, state and local codes.
3. It is the responsibility of the owner/operator of this generator to ensure that any person operating this equipment has been properly trained.
4. It is the responsibility of the owner/operator of this generator to ensure that any person operating this equipment has access to all manuals and information required for the safe use and operation of this equipment.
5. It is the responsibility of the owner/operator of this generator to ensure that it is properly maintained and safety inspected at regular scheduled intervals.
6. It is the responsibility of the owner/operator of this generator to ensure that any person who has not been trained on the safe use of this equipment does not have access to this equipment.

Read This Manual Thoroughly

If you do not understand any concept, any procedure, any safety warning statement, any safety caution statement or any portion of this manual, contact Baldor or your nearest authorized Baldor representative. We are happy to make sure you understand the information in this manual so that you can safely enjoy the full use of this generator.

Symbols

This symbol is shown throughout the manual to indicate a connection to ground reference point.

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Precaution Statements Used In This Manual

There are three classifications of precautionary statements used in this manual. The most critical is a **WARNING** statement, then the **Caution** statement and the least critical is the Note statement. The usage of each statement is as follows:

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Caution: Indicates a potentially hazardous situation which, if not avoided, could result in damage to property.

Note: Additional information that is not critical to the installation or operation.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions for the generator that should be followed during installation, operation and maintenance of the generator.
For ease of reading, the Warning statements are divided into four categories: Operation, Burn, Installation, and Maintenance.

Operation

WARNING: Never allow a person to ride in or on a trailer that is being towed. All states prohibit passengers in towed vehicles. A person can fall off and be struck be another vehicle or run over by the towed trailer. Failure to observe this warning can result in death.

WARNING: Before using a tow vehicle with a trailer mounted generator, verify that the vehicle is designed for the load. Using a vehicle that is too small is very dangerous. Be certain that it can handle the M.G.T.W. (Maximum Gross Trailer Weight) and the tongue weight for safe towing and braking.

WARNING: For a new trailer, the wheel lug nuts should be tightened to the proper torque specification before use, after 25 miles of operation and every 100 miles of operation thereafter. Failure to check the lug nuts for proper tightness can result in an accident due to a wheel falling from the trailer.

WARNING: Never operate a trailer or tow vehicle that has a loose, missing or broken lug nut. The trailer is designed for safe operation with all lug nuts installed and all at the proper torque rating. Operating the trailer with one or more broken or missing lug nuts greatly increases the load on the remaining nuts and can cause failure of the remaining nuts that can result in an accident due to a wheel falling from the trailer.

WARNING: Never operate this generator in a manner other than as described in this manual. Operation in any manner not described in this manual should be considered unsafe and should not be attempted. Never start the engine unless you have first verified that the installation and operation of the generator are as described in this manual.

WARNING: Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury.

WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.

WARNING: Over crank indication can mean a loss of crank disconnect signal during the previous run period. Attempting to restart the engine with no crank disconnect signal can destroy the starter motor, which can cause serious personal injury.

Continued on next page.

Operation Warning Statements Continued

WARNING: Hot exhaust gasses must never be directed toward anything that may catch fire or explode.

WARNING: This generator must not be used on or near any forest covered, brush covered, or grass covered land unless the engine's exhaust system is equipped with a spark arrestor. The spark arrestor must be maintained in effective working order by the operator.

WARNING: Some parts of this generator rotate during operation. Rotating parts can present extreme danger if clothing or body extremities are caught by the rotating part and can cause serious or fatal injury. Never touch a part of the generator until the engine has been stopped and all rotating parts are completely stopped. Also, disconnect the battery terminals to prevent accidental engine rotation during servicing.

WARNING: Never move a generator set that is running. Loads should be connected and position secure before starting the engine. Hazards are caused by moving a generator set that is running.

WARNING: Over crank indication can mean a loss of crank disconnect signal during the previous run period. Attempting to restart the engine with no crank disconnect signal can destroy the starter motor, which can cause serious personal injury.

WARNING: Never connect or disconnect loads during operation. Always connect load circuits before starting the engine and use external branch disconnects etc. to switch loads On/Off.

WARNING: Be sure that you understand how to stop the engine quickly in case of an emergency situation. Become familiar with the controls and safety systems provided with this generator set.

WARNING: Always wear safety glasses with side shields and hearing protection when working near the generator.

WARNING: Improper operation may cause violent motion of connected equipment. Be certain that unexpected movement will not cause injury to personnel or damage to equipment.

WARNING: Never operate the generator set indoors or in a poorly ventilated area such as a tunnel or cave. Exhaust fumes are extremely dangerous to all personnel that are in or in contact with that area.

WARNING: Never permit anyone to operate the generator without proper instructions. Be sure to keep a copy of this manual with the generator so that all users can be properly informed of its safe operation.

WARNING: Never allow children or pets to be in the area where the generator is running. The generator and the equipment being powered by the generator may cause injury or death.

WARNING: Never operate the generator unless all guards, covers, shields and other safety items are properly installed.

WARNING: Do not put hands, feet, tools clothing or other objects near rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.

WARNING: When operating this generator remain alert at all times. Never operate machinery when physically or mentally fatigued, or while under the influence of alcohol, drugs or medication.

WARNING: Never operate the engine when the air cleaner is removed. An engine backfire can cause serious burns.

WARNING: Never "jump start" a generator to start the engine. If the battery charge is insufficient to start the engine, charge or replace the battery and try to restart. Jump starting a battery can cause the battery to explode and cause severe injury or death to anyone in the area.

WARNING: High voltage is present whenever engine is running. Electrical shock can cause serious or fatal injury. Never operate electrical equipment while standing in water, on wet ground or with wet hands, feet or shoes or while barefoot.

WARNING: High voltage is present whenever the engine is running. Electrical shock can cause serious or fatal injury. Always stop engine before connecting or disconnecting power cords or external devices.

WARNING: Do not smoke near generator during operation or when close to fuel source. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death.

WARNING: Keep generator at least three feet away from buildings and other structures.

WARNING: Keep generator away from flammable or hazardous materials (trash, rags, lubricants, explosives, paints etc.) and grass or leaf build up.

WARNING: Keep a fire extinguisher near the generator while generator is in use. An extinguisher rated "ABC" by the National Fire Protection Association is appropriate.

Continued on next page.

Warning Statements Continued

Burn

WARNING: Parts of this generator are extremely hot during and after operation. To prevent severe burns, do not touch any part of the generator until you have first determined if the part is hot. Wear protective clothing and after use allow sufficient time for parts to cool before touching any part of the generator.

WARNING: Do not touch the hot exhaust parts. In addition to a sever burn, the sudden involuntary jerk of the hand or body part caused by contact with high voltage or a hot surface can result in injury to yourself or others.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

Installation

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

WARNING: Installation and repair procedures requires specialized skills with electrical generating equipment and small engine systems. Any person that installs or performs repairs must have these specialized skills to ensure that the generator set is safe to operate. Contact Baldor for installation or repairs.

WARNING: Be sure all wiring complies with the National Electrical Code (NEC) and all regional and local codes or CE Compliance. Improper wiring may cause a hazardous condition and exposure to electrical hazards can cause serious injury or death.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

WARNING: Place protective covers over all rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.

WARNING: Unauthorized modification of a generator set may make the unit unsafe for operation or may impair the operation of the unit. Never start a generator set that has been modified or tampered with. Be sure that all covers and guards are properly installed and that the unit is safe before starting the engine. If you are unsure, contact Baldor before starting the engine.

WARNING: When moving the generator, use reasonable caution. Be careful where you place fingers and toes to prevent injury "Pinch Points". Never try to lift a generator without a hoist or lift means because they are heavy and bodily injury may result.

Warning: Never connect this generator to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a generator to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the generator is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.

WARNING: Circuit overload protection must be provided in accordance with the National Electrical Code and local regulations.

WARNING: Check Ground Fault Circuit Interrupt (GFCI) receptacles monthly by using the "Test" and "Reset" buttons.

WARNING: Only a professional experienced technician should install a fuel supply system. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death. Fuel supply lines should be kept away from sharp objects to prevent rupture. Comply with all NFPA regulations and local codes for shut–off valves, regulators, fuel line type, connectors etc.

WARNING: Have electrical circuits and wiring installed and checked by licensed electrician or qualified technician. Electrical shock can cause serious or fatal injury.

Continued on next page.

Warning Statements Continued

WARNING: Incorrect installation of this generator set could result in property damage, injury or death. Connection of the generator to its fuel source must be done by a qualified professional technician or contractor.

WARNING: Never stand under or close to an object that is being hoisted or lift into position. Accidents happen and if the object falls or tips over you or someone else could be crushed by the weight of the object causing severe injury or death to to yourself or others. Always remain a safe distance from the object and always wear protective head gear (hard hat).

Maintenance

WARNING: Before servicing the generator set, be sure to disconnect the battery terminals to prevent accidental engine rotation or starting.

WARNING: Before cleaning, inspecting, repairing or performing any maintenance to the generator set, always be sure the engine has stopped and that all rotating parts have also stopped. After stopping, certain components are still extremely hot so be careful not to get burned. Before servicing the generator set, be sure to disconnect the spark plug wires and the battery terminals to prevent accidental engine rotation or starting.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

WARNING: Before servicing the generator set, be sure to disconnect the spark plug wires and the battery terminals to prevent accidental engine rotation or starting.

WARNING: Inspect all wiring frequently and replace any damaged, broken or frayed wiring or wires with damaged insulation immediately. Electrical shock can cause serious or fatal injury.

WARNING: Disconnect all electrical wires and load devices from generator power outlets before servicing the generator. Electrical shock can cause serious or fatal injury. Always treat electrical circuits as if they are energized.

WARNING: Check all fuel supply piping, and their connections monthly for fuel leaks. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death. If a leak is found, replace only with approved pipe or components.

WARNING: A battery presents a risk of fire and explosion because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery.

WARNING: Do not mutilate the battery or dispose of a battery in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: A battery presents a risk of electrical shock hazard and high short circuit current. Electrical shock can cause serious or fatal injury. Never wear jewelry, watch or any metal objects when in the area around the battery.

WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. If electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water. If electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.

Continued on next page.

Caution Statements

Caution: **Avoid installing the generator set beside heat generating equipment, or directly below water or steam pipes or in the vicinity of corrosive substances or vapors, metal particles and dust. Heat can cause engine problems to develop and unwanted substances can cause rust or generator failure over time.**

Caution: **Do not apply high voltage to windings (do not start the generator) in a moisture–saturated condition. Moisture can cause insulation breakdown, making it necessary to return the generator to the factory for repair, and consequent expense and loss of time.**

Caution: **Use only original equipment or authorized replacement parts. Using the correct parts will assure continued safe operation as designed.**

Caution: **Do not support the generator from the top of the frame or enclosure.**

Caution: **Do not tamper with or change the engine speed. Engine speed is factory set to produce the correct voltage and output frequency.**

Caution: **Never operate the engine without a muffler. The engine is designed to have the correct exhaust components installed and operating without these components can present a fire hazard, cause excessive exhaust gases and cause damage to engine. Inspect muffler periodically and replace if necessary.**

Caution: **The Programmable Output Contacts selection must agree with the external control wiring prior to energizing the controller. Failure to do so may cause severe equipment damage.**

Caution: **If a dead battery is suspected, remove the controller fuse, charge battery (or replace), and then attempting starting. Damage to engine control may result from jump starting.**

Caution: **This generator must have a battery installed for operation. The battery is used during starting and during operation. If engine operation is attempted while the battery is removed, damage to the engine's electrical components may result.**

Section 2
General Information

Thank you for purchasing your Baldor Generator Set. This manual contains information you need to safely and efficiently install and operate your generator set. During the preparation of this manual every effort was made to ensure the accuracy of its contents. This manual describes only very basic engine information. A separate owner's manual for the engine is supplied with this unit for your use. Please refer to the engine manual for information relative to engine operation, maintenance, recommendations and additional safety warnings.

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Baldor Generators have earned the reputation of being high quality and dependable. We take pride in this fact and continue to keep our quality standards high on our list of priorities. We are also constantly researching new technological ideas to determine if they could be used to make our generator sets even better.

Baldor makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of fitness for any particular purpose. The information in this document is subject to change without notice. Baldor assumes no responsibility for any errors that may appear in this document.

Limited Warranty

Baldor Generators will replace or repair free of charge any part or parts of the generator of their manufacture that are defective in workmanship and materials for a period of time as set forth in the Warranty Period chart below. All Baldor products requiring warranty service shall be transported or shipped freight pre−paid, at the risk of the party requiring warranty service, to a Baldor Generator repair facility, or to Baldor Generators' Customer Service Department in Oshkosh, Wisconsin. Written notification of the alleged defect in addition to a description of the manner in which the Baldor generator is used, and the name, address and telephone number of the party requiring warranty service must be included. Baldor is not responsible for removal and shipment of the Baldor product to the service center or for the reinstallation of the Baldor product upon its return to the party requiring warranty service. Problems with Baldor products can be due to improper maintenance, faulty installation, non−Baldor additions or modifications, or other problems not due to defects in Baldor workmanship or materials. If a Baldor Generator repair facility determines that the problem with a Baldor product is not due to defects in Baldor workmanship or materials, then the party requesting warranty service will be responsible for the cost of any necessary repairs. EXCEPT FOR THE EXPRESSED WARRANTY SET FORTH ABOVE, BALDOR GENERATORS DISCLAIMS ALL OTHER EXPRESSED AND IMPLIED WARRANTIES INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WHETHER OR NOT SIMILAR IN NATURE TO ANY OTHER WARRANTY PROVIDED HEREIN, SHALL EXIST WITH RESPECT TO THE GOODS SOLD UNDER THE PROVISIONS OF THESE TERMS AND CONDITIONS. ALL OTHER SUCH WARRANTIES ARE HEREBY EXPRESSLY WAIVED BY THE BUYER. UNDER NO CIRCUMSTANCES SHALL BALDOR GENERATORS BE LIABLE OR RESPONSIBLE IN ANY MANNER WHATSOEVER FOR ANY INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR ANTICIPATED PROFITS RESULTING FROM THE DEFECT, REMOVAL, REINSTALLATION, SHIPMENT OR OTHERWISE. This is the sole warranty of Baldor Generators and no other affirmations or promises made by Baldor Generators shall be deemed to create an expressed or implied warranty. Baldor Generators has not authorized anyone to make any representations or warranties other than the warranty contained herein.

Warranty Period

Generator Series	Labor*	Parts
Portable Products (Premier, Powerchief, DG Series, K Series)	1 Year	3 Years
Towable Products (TS)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
POW'R LITE Light Towers	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first Excluded from any warranty coverage regardless of time period: Light Fixture, Lamps and Ballasts
3600 RPM Standby Systems (Some AE Models)	1 Year or 1,000 Hours Whichever comes first	3 Years or 1,000 Hours Whichever comes first
1800 RPM Standby Systems (Some AE Models, DLC, GLC)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
Industrial Standby Systems	1 Year or 1,000 Hours Whichever comes first	2 Years or 1,000 Hours Whichever comes first
Industrial Prime Power Systems	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first
International	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first

*For products covered under labor coverage, travel expenses will be allowed up to 7 hours straight labor or 300 miles, whichever occurs first and only applies to permanently wired and mounted products (AE, DLC, GLC, IDLC).
No warranty registration card is necessary to obtain warranty on Baldor Generators.
You must save the purchase receipt. Proof of purchase, date, serial number and model number will be required for all portable and Towable products to qualify for any warranty consideration.
For all other products, a start−up inspection form/warranty registration must be completed in its entirety and submitted to Baldor Generators within 30 days of start−up to qualify for any warranty consideration.

Section 3
Receiving & Installation

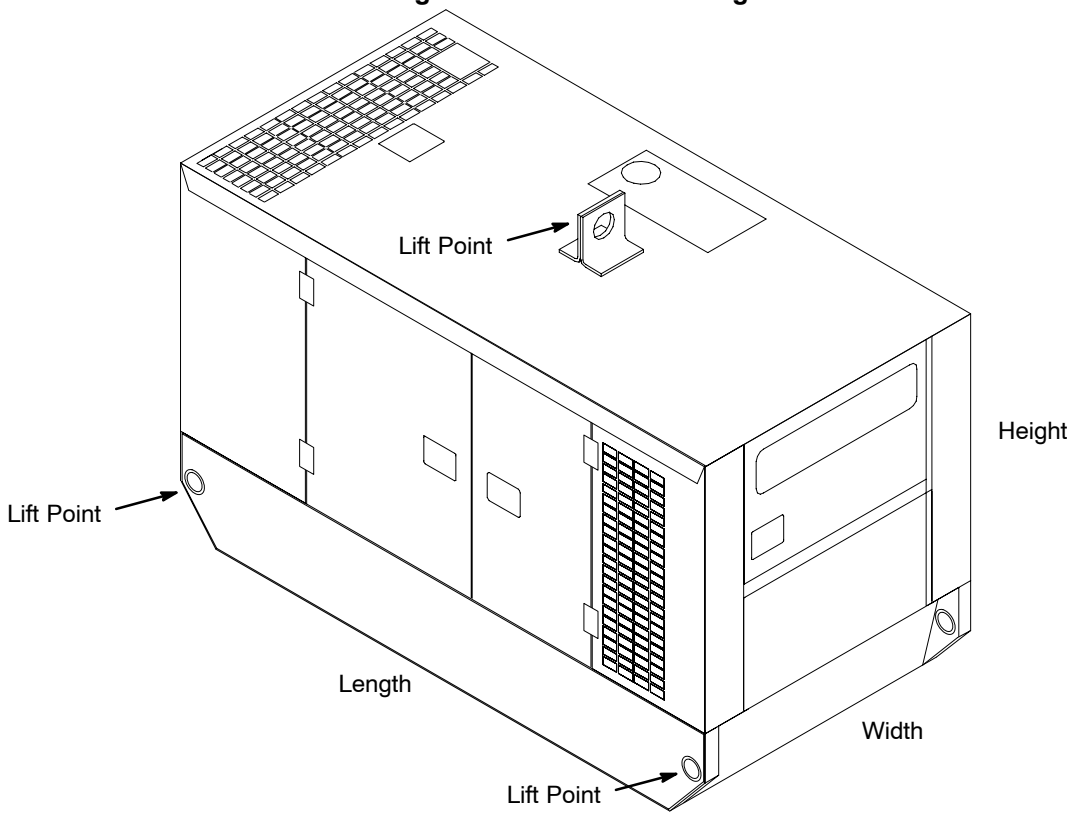
Receiving & Inspection When you receive your generator, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your system.
2. Verify that the part number of the system you received is the same as the part number listed on your purchase order.
3. If the system is to be stored for several weeks before use, be sure that it is stored in a location that conforms to published storage temperature and humidity specifications.

WARNING: Never stand under or close to an object that is being hoisted or lift into position. Accidents happen and if the object falls or tips over you or someone else could be crushed by the weight of the object causing severe injury or death to to yourself or others. Always remain a safe distance from the object and always wear protective head gear (hard hat).

Lifting the Generator When lift or hoist equipment is used to lift the generator and move it to position, be careful not to contact overhead wires or other obstacles. The generator can weigh as much as 7,000 lbs. Be sure lift or hoist equipment has appropriate tires for the terrain to avoid becoming stuck or tipping over. If the shipping pallet is intact, use a fork lift to move the generator. If the shipping pallet has been removed, use two steel pipes through the "Lift Point" holes to lift the generator. See Figure 3-1. The lift points are designed only for the weight of the generator. Do not lift by these points if the generator is mounted to a trailer or has other items attached.

Figure 3-1 Generator Lifting



Physical Location The mounting location of the system is important. It should be installed in an area that is protected from direct harmful gases or liquids, dust, metallic particles, shock and vibration. It should be installed in an outdoor location so the exhaust fumes are vented to the atmosphere.

When the Generator is installed outdoors (skid mount)

If the generator is installed outdoors there should not be a cooling problem. The factory installed enclosure is designed to keep out undesirable weather elements while providing cooling and ventilation.

Several other factors should be carefully evaluated when selecting a location for installation:

1. For effective cooling and maintenance, the system should be mounted on a flat, smooth, noncombustible level surface. A concrete pad is ideal and provides a secure installation.
2. Installation should prevent water levels from reaching the generator. Drainage must be adequate to keep concrete pad free from standing water.
3. Installation should prevent obstructions by buildup of leaves, grass, sand, snow, etc. If these items pose a problem, consider building a small fence or other break to protect the unit from accumulation of debris.
4. Installation should place the generator as close as possible to the transfer switch.
5. At least forty−eight (48) inches clearance must be provided on all sides for air flow.
6. Access must be provided to allow the enclosure covers to be opened or removed for service and maintenance.
7. Maximum Ambient temperature is 122°F (50°C).

Figure 3-2 Generator Mounting (Skid)

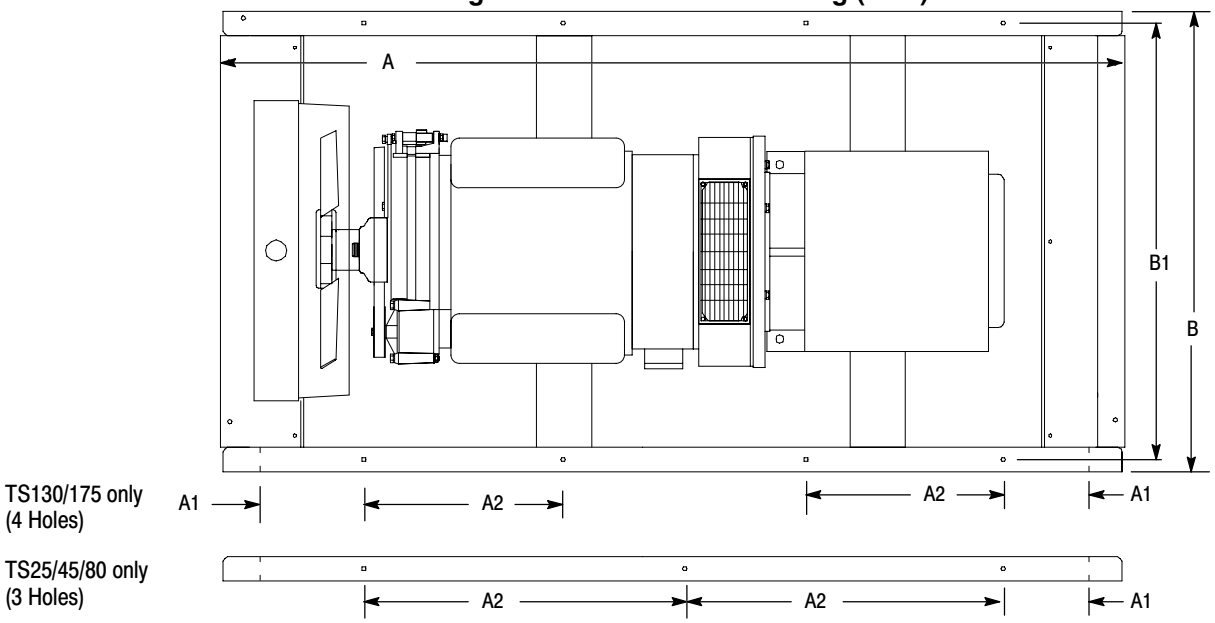


Table 3-1 Mounting Dimensions

Generator	A	A1	A2	B	B1	B2
TS25	74.0	8.12	23.81	38.0	36	6.25
TS45	84.0	8.38	28.56	38.0	36	6.25
TS80	84.0	8.38	28.56	38.0	36	6.25
TS130	118.0	16.57	26.57	42.0	40	6.25
TS175	118.0	16.57	26.57	42.0	40	6.25

Secure the Generator (Skid Mount only)

Six mounting bolts (eight for TS130/175) in the base frame secure the generator to the shipping pallet. Remove these bolts, lift the generator and remove the shipping pallet. Secure the generator to the concrete pad using anchor hardware (not provided) in the base frame mounting holes (holes are 0.66" diameter). See Figure 3-2 and Table 3-1. Anchor bolts must be long enough to extend through the generator mounting frame.

Hot Exhaust Gasses

WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.

WARNING: Hot exhaust gasses must never be directed toward anything that may catch fire or explode.

Exhaust must always be directed away from living areas or buildings that are occupied by people or animals. Never allow exhaust gases to be directed towards any openings or air entry routes (doors, windows, vents, etc...) of an occupied building.

The direction of the discharged hot air and hot exhaust gases is important as they have the potential to create brown spots on the lawn or shrubs. In extreme cases this extremely hot air could cause dried grass, shrubs, trees or other debris to ignite.

It is also recommended that an exhaust rain cap be used whenever it is possible that rain could get into the system. This will help to prevent corrosion and damage to the exhaust system and engine.

Installation

The generator is completely assembled, tested and adjusted at the factory before it is shipped to you. The procedures presented in this manual are suggestions and it is the responsibility of the Owner/Operator to arrange for these procedures to be performed by licensed contractors according to all applicable codes including local codes for your Municipality/City/County and State. External connections required at the time of installation are:

1. Electrical Connections – power wiring (optional transfer switch) and control wiring.
2. Ground Connection.

After installation, the post installation checks must be performed prior to starting the engine.

After these checks have been performed and the system operation is verified to be good, refer to Section 5 Maintenance for periodic checks that must be performed at scheduled intervals to ensure continued operation with minimal problems.

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Fuel Connections

Fuel connections are not required. A self contained fuel tank is located within the base of the generator set.

Electrical Connections Class 1 wiring methods must be used for field wiring connections to terminals of a class 2 circuit. It is the responsibility of the owner/operator to arrange for these procedures to be performed by a licensed electrical contractor and ensure conformance to all applicable codes including local codes peculiar to your municipality/city/county and state. Wire size and insulation type should be as required by NEC (National Electrical Code) and local codes.

Warning: Never connect this generator to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a generator to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the generator is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.

Warning: Incorrect installation of this generator set could result in property damage, injury or death. Connection of the generator to its fuel source must be done by a qualified professional technician or contractor.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

Intended Use The intended purpose of this generator set is to provide emergency power when the main utility power supply is interrupted. Therefore, it is important that all the wiring that connects the generator set with your house, transfer switch, distribution box, battery charger, etc. be properly installed.

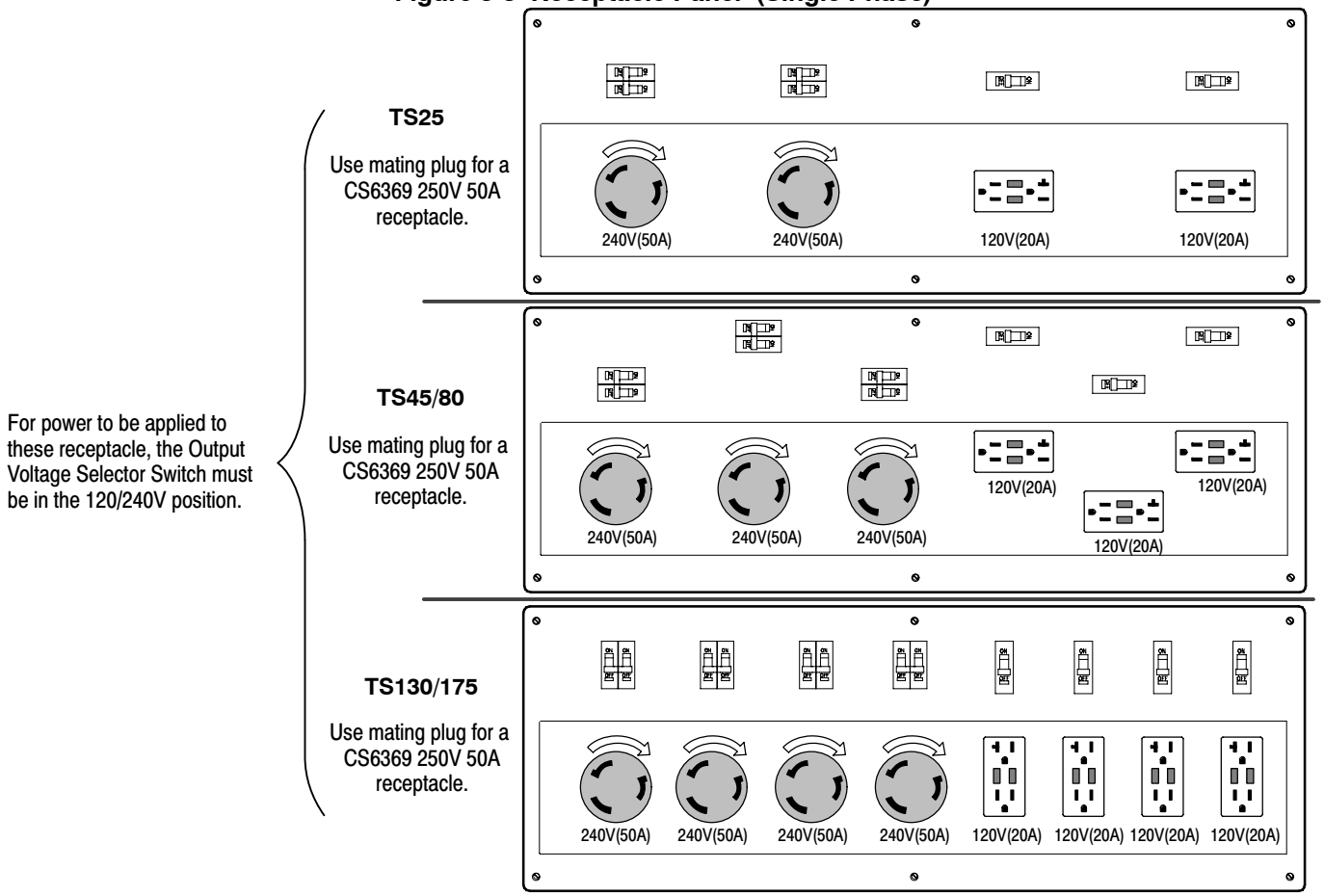
Protection **Single Phase** circuit protection is provided within the generator. The power output connections are rated and sized according to the KW of the generator. Proper lead wire from these points to the automatic transfer switch (or load switching device) is mandatory. See transfer switch information for corresponding generator input terminals.
Three phase circuit protection is not provided with the generator. When connecting the generator output to an electrical load, a UL listed circuit breaker with the appropriate ratings shall be provided within 25 feet of the Genset. Use only copper wires.

Generator Catalog No.	Input Breaker	
	3 Phase VAC	3 Phase Amps
TS25	208/240/480	62.5/54.1/27.1
TS45	208/240/480	121.4/105.3/52.6
TS80	208/240/480	190.8/165.4/90.2
TS130	208/240/480	329.6/285.7/145.8
TS175	208/240/480	433.7/375.9/203.0

Single Phase Connections

Single phase connections are made at load receptacles located by the operator panel, see Figure 3-3. Simply open the rear panel access door and make the connections. When the panel door is closed, the connections are weather tight.

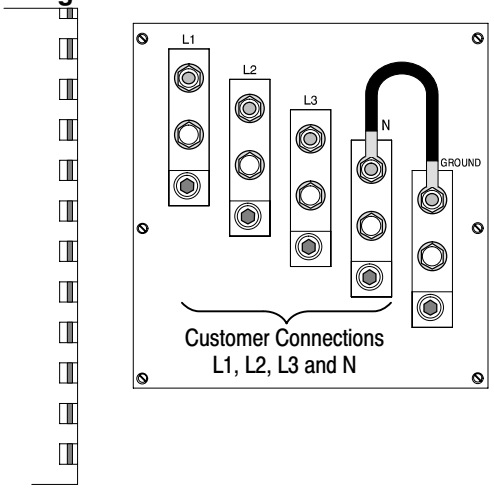
Figure 3-3 Receptacle Panel (Single Phase)

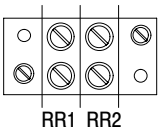


Three Phase Connections

Three phase connections are made at L1, L2, L3 and N connections shown in Figure 3-4.

Figure 3-4 Three Phase and Remote Start Connections





Remote Start Connections

Transfer Switch Considerations

The following are general considerations for the safe use of a transfer switch:

1. The transfer switch should be located inside the building near the main breaker box or the disconnect box.
2. The transfer switch must be kept away from any location that might allow water to get on it.
3. If the transfer switch is mounted outside, it must be protected from the environment and it's elements.
4. Do not mount the transfer switch on the generator set.
5. Do not mount the transfer switch where flammable liquids or vapors are present.

Remote Start Contacts

This two−wire connection will start and stop the generator, when properly connected to a remote start contact, shown in Figure 3-4. These contacts RR1 and RR2 are connected to the "Engine Start Contacts" of the automatic transfer switch. A two pole normally open, closed to operate switch may also be used to start the generator.

AC Input These connections are for units with float type battery charger or engine block heater. A constant supply of 120 volts AC (or as specified) is needed at these terminals to power these devices when generator is not operating.

Note: Power is not required when the unit is in operation. Internal battery charging and radiant heat during operation eliminate the need for these devices.

Battery Charger Considerations

1. Mount the battery charger inside the generator enclosure as close to the battery as is reasonably possible.
2. Do not mount the battery charger where flammable liquids or vapors are present. When the battery is charging it produces explosive gasses.

General Wiring Considerations

1. When routing the interface wiring, do not route it up against anything that could cut or chafe the wiring. do not route the wire up against any hot or potentially hot object.
2. Make sure that all the electrical components (generator set, transfer switch, battery charger, etc.) share a common ground.
3. Check with your local building inspector to determine what you must do to comply with the local regulations for grounding of this type of permanent installation.

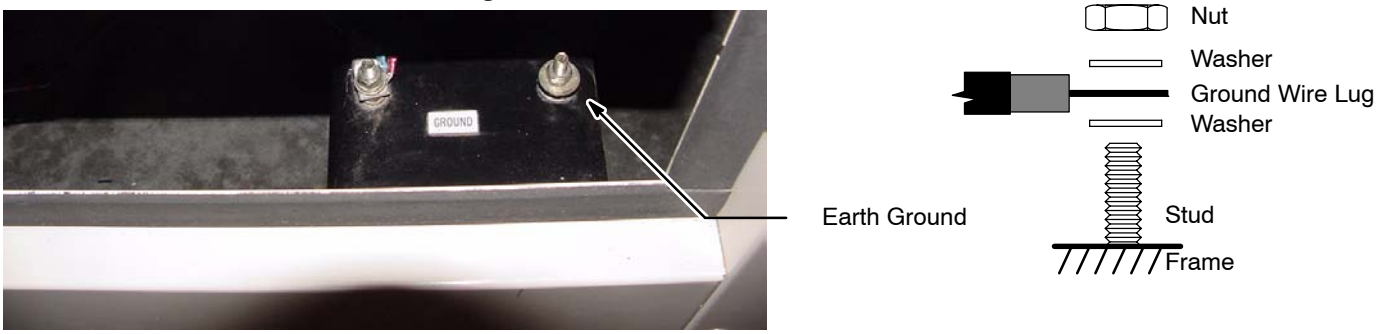
Frame Ground Connection

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

It is important for safety reasons that the Generator set, transfer switch and battery charger share a common Ground and neutral.

The NEC requires that the frame and exposed metal surfaces be at local ground reference potential to avoid electrical shock hazard. A local ground reference may require a driven earth ground conductor at the generator installation site. Make the ground connection as shown in Figure 3-5. Use the appropriate size wire as required by NEC and local codes.

Figure 3-5 Frame Ground Connection



1. Open the enclosure access panel door 2 (Figure 3-2).
2. Connect the ground wire to the “earth ground” terminal shown in Figure 3-5. This ground is the local reference ground to ground the generator frame only.

Caution: This generator must have a battery installed for operation. The battery is used during starting and during operation. If engine operation is attempted while the battery is removed, damage to the engine’s electrical components may result.

Battery Connections The generator is shipped with no battery installed.

WARNING: Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

WARNING: Do not dispose of battery or batteries in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: Do not mutilate the battery . The battery contains electrolyte solution which is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: A battery presents a risk of electrical shock hazard and high short circuit current. The following precautions are to be followed when working on batteries:

1. Remove watches, rings, necklaces and all other metal objects.
2. Use tools with insulated handles.
3. Wear safety goggles, rubber gloves and boots.

WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following precautions are to be followed when working on batteries:

1. Wear full eye protection (safety glasses or goggles) and protective clothing.
2. Where electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water.
3. Where electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.
4. Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of one pound (500 grams) bicarbonate of soda to one gallon (four liters) of water. the bicarbonate solution is to be added until evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.

WARNING: A battery presents a risk of fire because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery. The following precautions are to be followed when working on batteries:

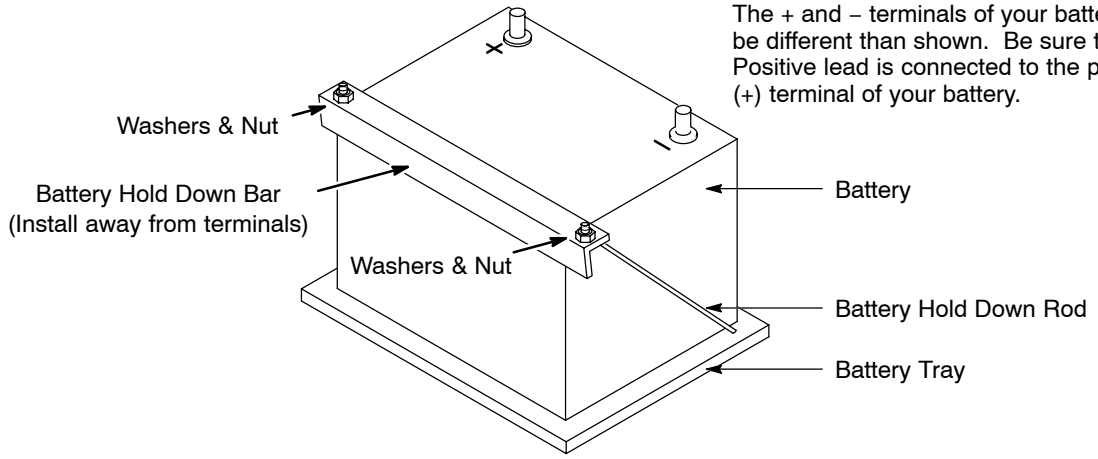
1. Do not smoke when near batteries.
2. Do not cause flame or spark in battery area.
3. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Procedure: The correct type battery must be installed in the battery compartment provided, see Table 3-2. Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions.
Keep unauthorized personnel away from batteries.

1. Open access doors and locate battery tray.
2. Remove battery cables from the battery, the (–) negative first then the (+) positive.
3. Remove the Battery Hold Down Bar and Rods.
4. Remove the old battery and place the correct new battery (see Table 3-2) on the tray.
5. Install the Battery Hold Down Bar and Rods as shown in Figure 3-6.
   a. Place the bent end of the Battery Hold Down Rod through the hole in the Battery Tray.
   b. Place the threaded end of the Battery Hold Down Rod through the hole in the Battery Hold Down Bar and secure with flat washer, lock washer and nut.
   c. Repeat steps a and b for the other Battery Hold Down Rod.

Figure 3-6 Battery Installation



6. Connect the positive lead to the positive (+) battery terminal.
7. Connect the negative lead to the negative (–) battery terminal.
8. Do not lay tools or metal parts on top of batteries.
9. Connect charging source to the battery terminals.
10. Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Recommended Engine Oil and Battery Type

When replacing batteries, use only the recommended battery for your generator, see Table 3-2.

Table 3-2 Oil & Battery Recommendations

MODEL	SUMMER OIL	WINTER OIL	OIL CAPACITY	RECOMMENDED BATTERY	(AMPS) COLD CRANKING
TS25	SAE. 20W/50	5W/30	7.0 QTS	BCI Group 24	925
TS45	SAE. 20W/50	5W/30	14.0 QTS	BCI Group COM	925
TS80	SAE. 20W/50	5W/30	14.5 QTS	BCI Group COM	925
TS130	SAE. 20W/50	5W/30	18.0 QTS	BCI Group COM	(2) 750
TS175	SAE. 20W/50	5W/30	33.75 QTS	BCI Group COM	(2) 750

Post Installation Checks

When the initial installation is complete, these checks must be performed before starting the engine. These checks are not required before each start, only after the initial installation.

1. Generators that have been in transit or storage for long periods may be subjected to extreme temperature and moisture changes. This can cause excessive condensation, and the generator windings should be thoroughly dried before bringing the generator up to full nameplate voltage. If this precaution is not taken, serious damage to the generator can result.

Caution: Do not apply high voltage to windings (do not start the generator) in a moisture−saturated condition. Moisture can cause insulation breakdown, making it necessary to return the generator to the factory for repair, and consequent expense and loss of time.

Note: These precautions are especially necessary in locations such as seaboard installations and other high humidity areas. Some installations will be in atmospheres that are much more corrosive than others. Prevention of a failure is better than being forced to make a repair.

2. Verify that the transfer switch is in Utility Power mode. No power must be present at the generator or transfer switch connections. Verify with a voltmeter.
3. Verify that the engine starting battery is disconnected so accidental starting is not possible.
4. Verify generator is securely mounted and anchored to cement pad (skid mount only).
5. Verify that proper clearance exists on all sides and top of enclosure.
6. Verify no debris (buildup of leaves, grass, sand, snow, etc.) is present.
7. Assure generator is a safe distance from any flammable or combustible material.
8. Verify that the three phase generator power (L1, L2, L3 and N) are properly connected to the transfer switch (3 phase power only).
9. Verify that the generator and transfer switch load are voltage compatible.
10. Verify that no load is connected to the circuit breaker and/or transfer switch.
11. Inspect the engine and generator and verify that there are no loose wires or components. Tighten if necessary.
12. Verify that the ground conductor is of correct wire size and properly connected.
13. Verify engine oil level is full. Refer to engine manual if necessary.
14. Verify engine coolant level is full. Refer to engine manual if necessary.
15. Verify exhaust system to assure it is in properly connected and pointing away from occupied living space, air entry routes (doors, windows, vents etc.) and combustible materials.

Post Installation Checks Continued

16. Place the voltage output selector switch in the appropriate position (120/240 so the receptacles are powered or as required for your load).
17. Verify all loads are disconnected.
18. Verify that the Master Control Switch is still in the “Stop” position.
    Connect the engine starting battery to the starter. Verify it is installed correctly.
19. Verify the fuel source is ON and the pressure and flow rate is correct.
20. Remove all tools, rags, etc. from inside the generator enclosure. Close all enclosure doors and be sure no hands are inside the generator enclosure when it starts.
21. Start the generator.
22. The engine should begin to crank and start when the fuel moves through the pipe to the carburetor. If the engine fails to start, refer to Section 5 Troubleshooting.
23. With the engine running, several checks must be made:
    a. Verify there are no fuel leaks. If a fuel leak is detected, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair the leak before proceeding.
    b. Verify there are no coolant or oil leaks. If a leak is detected, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair the leak before proceeding.
    c. Verify that operation is smooth. If squeals, vibrations or other abnormal sources of noise exist, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair before proceeding.
    d. Verify that the correct voltage exists at the receptacles.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

24. After the operation checks are made, stop the engine (move the Master Control Switch to the “Stop” position) and wait 2 hours for the engine to cool. When the engine is cool, check engine oil and coolant levels as instructed in the engine operation manual.
25. Close all enclosure covers. The post installation checks are now complete.

Towing the Generator

WARNING: Never allow a person to ride in or on a trailer that is being towed. All states prohibit passengers in towed vehicles. A person can fall off and be struck be another vehicle or run over by the towed trailer. Failure to observe this warning can result in death.

WARNING: Before using a tow vehicle with a trailer mounted generator, verify that the vehicle is designed for the load. Using a vehicle that is too small is very dangerous. Be certain that it can handle the M.G.T.W. (Maximum Gross Trailer Weight) and the tongue weight for safe towing and braking.

WARNING: For a new trailer, the wheel lug nuts should be tightened to the proper torque specification before use, after 25 miles of operation and every 100 miles of operation thereafter. Failure to check the lug nuts for proper tightness can result in an accident due to a wheel falling from the trailer.

WARNING: Never operate a trailer or tow vehicle that has a loose, missing or broken lug nut. The trailer is designed for safe operation with all lug nuts installed and all at the proper torque rating. Operating the trailer with one or more broken or missing lug nuts greatly increases the load on the remaining nuts and can cause failure of the remaining nuts that can result in an accident due to a wheel falling from the trailer.

- Make sure the tow vehicle is able to tow the load. Vehicle brake capacity is extremely critical and the tow vehicle must be able to handle the additional weight of the trailer mounted generator. Radiator and transmission cooling must also be considered.
- Be sure hitch capacity is equal to or greater than the load when mounted on the vehicle.
- Be sure the size and rating of the hitch ball is equal to or greater than the load.
- Make sure the safety chain(s) rating is equal to or greater than twice the maximum gross trailer weight rating of your trailer.
- It is against the law to carry passengers in the back of any trailer.
- Reduce weight in car trunk and rear seat areas by the amount of tongue weight of your trailer.
- Any alterations or changes made to the trailer void any express or implied warranties on the trailer or towing equipment.

Selecting the Proper Towing Equipment

When selecting the proper towing equipment, the two most important factors that must be considered are the M.G.T.W. (Maximum Gross Trailer Weight) and the Tongue Weight. The M.G.T.W. is the total weight of the trailer plus the payload in the trailer. The tongue weight is the downward pressure exerted at the coupler. The easiest way to measure the gross trailer weight is to place the loaded trailer on a vehicle scale making sure that the scales are supporting the entire weight of the loaded trailer.

The easiest method to measure tongue weight (up to 300 lbs.) is to place the jack stand (trailer tongue) on a bathroom scale making sure the trailer is level. For heavier tongue weights, place a board across the bathroom scale and a solid object of the same thickness as the scales with a piece of pipe between each. The trailer tongue should be level and in its normal towing position. Multiply the scale reading by three (3) to obtain the tongue weight. Tongue weight should be 10% of trailer weight and not more than10% of M.G.T.W.

Tow Vehicle

Make sure the vehicle you are using to tow the trailer is capable of towing the weight. Check the vehicle Owner's Manual for towing capability of the towing vehicle or contact the car dealer for this information. Make sure the tow vehicle is able to tow the load. Vehicle brake capacity is extremely critical and the tow vehicle must be able to handle the additional weight of the trailer mounted generator. Radiator and transmission cooling must also be considered.

Table 4-1 Tow Hitch Capacity

Tow Vehicle	Hitch Class	Maximum Tow Capacity	Maximum Tongue Weight
Compact Vehicle	Sub Class I	1000 Lbs.	100 Lbs.
Compact Vehicle	Class I	2000 Lbs.	200 Lbs.
Mid & Full Size Vehicle	Class II	3500 Lbs.	300 Lbs.
3/4 Ton or larger Truck	Class III & 4	5000 Lbs. Plus	500 Lbs. Plus

Selecting the Proper Towing Equipment Continued

Electrical Trailer Wiring

All trailers must have taillights, brake lights and turn signals connected to the towing vehicle's electrical system. It is also recommended that a heavy duty turn signal flasher and emergency flasher (if separate) be installed since the trailer lights place an extra load on car flasher units.

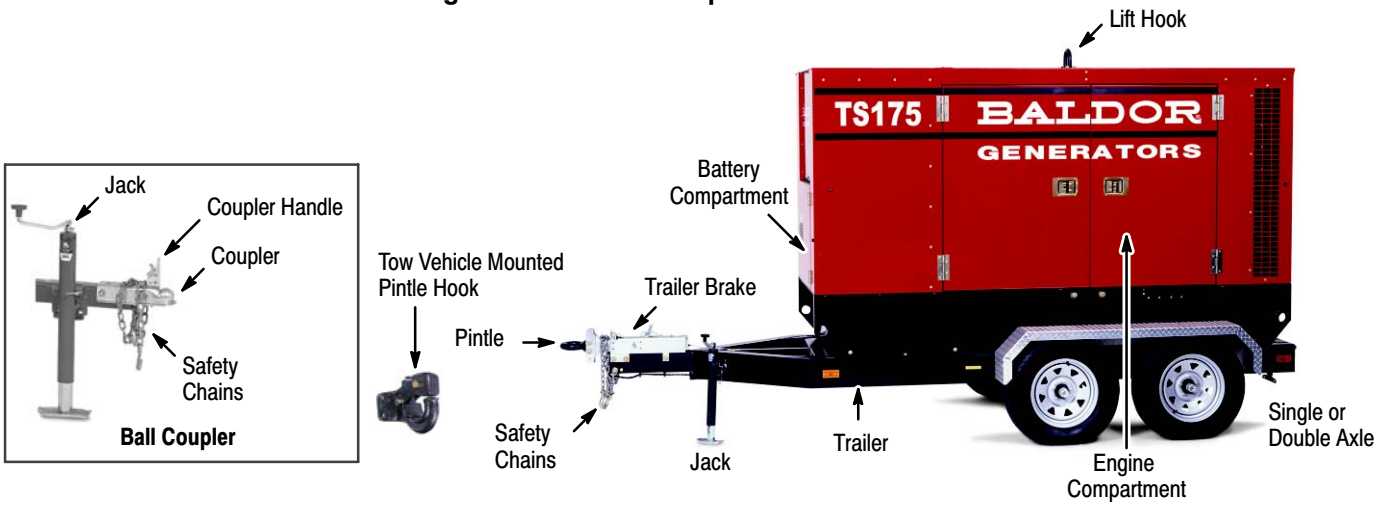
Towing Heavy Trailer Loads

1. Trailer brakes. In all cases refer to your vehicle's owner manual and the trailer operating manual to be certain you have an adequate braking system to handle the vehicle/trailer combination. Also, State requirements, road and weather conditions and grade of road, etc. should be considered for trailer braking.
2. Additional equipment. The following items may be helpful for towing heavy loads. Consult your vehicle's owner manual or dealership for recommended towing accessories.
   a. Overload Springs
   b. Overload or air shocks
   c. Transmission Oil Cooler
   d. Engine Oil Cooler
   e. Coolant recovery System
   f. Heavy Duty Fan
   g. Side View Mirrors
   h. Sway Control

Safe Driving Tips

1. Loading Trailer. The trailer should be loaded so that the downward tongue weight is approximately 10% of the gross trailer weight.
2. Following and stopping distance. The stopping distance is increased when towing a trailer. A rule of thumb for the minimum distance that should be maintained between you and the preceding car on dry pavement is one car and trailer length (2 car lengths) for every 10 MPH you are traveling. The distance should be increased accordingly depending on road and weather conditions. Avoid sudden stops if possible.
3. Passing. Accelerating and passing should be done slowly to allow extra distance for passing. Signal well in advance when passing and returning to the proper lane. Allow for the extra length of the trailer before changing lanes. Never change lanes abruptly as this may cause the trailer to sway and push the tow vehicle into a "jack knife" condition.
4. Turning. Allow for the extra length of the trailer. Drive slightly beyond normal turning point to avoid running over curbs and soft shoulders. Turning radius increases when towing.
5. Uphill and Downhill Grades. Reduce speed and use a lower transmission gear for steep or long up or down hill grades. Maintain safe distance from other vehicles.
6. Parking.
   - Avoid parking on uphill or downhill grades
   - Place transmission in "PARK"
   - Apply parking brake.
   - Use wheel chucks.
   - In a parking lot, avoid parking close to other vehicles. Turning radius is greater and it may be impossible to get out of a parking space after a few other vehicles have parked around your vehicle.
7. Trailer Sway. If trailer sways, reduce speed by applying trailer brakes rather than car brakes to control sway. If excessive sway persists, consult your local dealer for help.
8. Trailer Backing. Backing a trailer can be frustrating. The most important item to remember is that the trailer will go in the opposite direction of the tow vehicle. It is helpful to have another person help you back the trailer and watch for objects. Turn the vehicle's wheels to the right to make the trailer go left, and vice versa. Put your hand at the bottom of the steering wheel. The trailer will go in the same direction your hand moves (moving your hand to the right will cause the trailer to go right, and vice versa). Sharp steering wheel corrections will cause the trailer to jackknife and may cause damage to the rear of the tow vehicle or the front of the trailer.

Figure 4-1 Trailer Component Identification



Caution: Large "Engine Compartment Doors" on each side of enclosure must remain closed during operation. If doors remain open, engine will overhead due to restricted air flow.

Safety Checks The following items should be checked before each use and once every 100 miles of towing:

1. Verify the tow vehicle is designed to tow the trailer before trailer is connected to the vehicles hitch. Using a tow vehicle that is too small is very dangerous.
2. Verify the stop, tail and turn signals are working properly. Replace damaged lenses, reflectors or bulbs.
3. Check wires for good connections and possible fraying or wearing of insulation.
4. Check and properly maintain the trailer, hitch, jack, ball and coupler.
5. Inspect hitch and ball for damage. Ball or hitch can be damaged in parking, hitting curbs, dragging when crossing ditches or railroad tracks.
6. Check and properly tighten all bolts on trailer, hitch, ball and coupler (including wheels).
7. Check safety chains for wear and do not allow them to drag on ground or roadway.
8. Test breakaway system.
   Hydraulic surge brake system, normally has a cable or chain connected to the tow vehicle. In a break away condition, this cable or chain activates the master cylinder and operates the brakes as the trailer stops.
   An electric brake system, the emergency breakaway system has a battery, charger, breakaway switch with a pull pin and cable connected to the tow vehicle. In a break away condition, this cable operates the electric brakes (power provided by the brake battery) as the trailer stops.
9. Check all generator mounting hardware for tightness. (Loosens with vibration).
10. Check tow vehicle tires for wear and proper inflation (check vehicle's owner manual for proper level of inflation of tires for towing a trailer).
11. Check trailer tires for wear and proper inflation. Replace only with a tire of the same size and capacity ratings.
12. Carry emergency flares, reflectors and fire extinguisher (required in some states).
13. Carry spare light bulbs and fuses.
14. Wheel bearings should be checked and replaced after the first 100 miles, and every 4000 miles thereafter or at least once a year. Wheel bearing grease or a good grade of multi–purpose grease should be used for packing wheel bearings. If you don't know how to repack your wheel bearing, take your trailer to a service shop. Be sure to properly tighten the axle nut and wheel nuts during assembly.
15. For proper tow vehicle maintenance while towing a trailer, check vehicle's owner manual and manufacturer's specifications.

Towing Instructions See Figure 4-1 for component identification.

1. Be sure the generator is off.
2. Shut all enclosure doors and latch the locks.
3. Back the tow vehicle to within a few inches of the trailer coupler (Pintle or Ball).
4. Be sure the Coupler Handle is in the “UP” (open) position or the Pintle Hook is Open.
5. Adjust the trailer jack for the height of the hitch on the tow vehicle.
6. Back the tow vehicle so the trailer coupler is directly over the tow vehicle ball hitch or the Pintle hook.
7. Lower the trailer so the trailer coupler rests securely on the ball hitch of the tow vehicle. Move the Coupler Handle to the horizontal position and lock it in place to securely hold the ball hitch of the tow vehicle.
   OR
   Latch the Pintle and lock the Pintle device securely.

Note: If this is not done properly, the trailer may become unhitched when it is towed.

8. Retract the front jack, pull the jack pin and rotate the jack 90 degrees from vertical to the horizontal position, making sure the self−locking pin reseats and the jack is secured to the tow bar (stowed position).
9. Connect safety chains, making sure to cross them. If a safety chain is too long, simply twist it a few turns to shorten the chain before attaching to the tow vehicle.
10. Connect the trailer light connector to the tow vehicle.
11. Test the trailer lights to ensure they are operational.
12. Check tires for 32 psi inflation.
13. Check wheel lug nuts for correct tightness, 90 lb−ft torque.
14. Verify that all jacks, pins, cables, and doors are secured.
15. Remove tire chocks (if used). These prevent the trailer from moving when parked.

Trailer Setup See Figure 4-1 for component identification. Carefully read all instructions before starting.

1. Locate a suitable, level location. Also be sure there are no overhead wires or obstructions.
   The trailer is balanced so the majority of the weight rests on the tow bar (Jack).
   If on a minor incline, the safest way to position the tailer is to have the tow bar facing down the incline (front of the trailer lower than the rear of the trailer).
2. Install tire chocks if used. These prevent the trailer from moving when parked.
3. Disconnect the safety chains and the trailer light connector from the tow vehicle.
4. Pull the pin on the front jack and rotate the jack 90 degrees to the vertical position. Lock the jack in the vertical position using the pin to secure it.
5. Move the Coupler Handle to the vertical position to release the ball hitch.
   OR
   Release the Pintle hook.
6. Use the jack to raise the trailer coupler from the ball hitch of the tow vehicle.
7. The tow vehicle can now be moved away from the trailer.
8. Use the jack to level the trailer for operation.

Pre−Start Procedure The operator panel is shown in Figure 4-2.

Before attempting to start the generator set, several things must first be verified or performed. These are:

1. Fill system fuel tank with clean, fresh diesel fuel.
2. Fill engine crankcase to full mark with clean, fresh lubricating oil per attached engine operating guide.
3. Radiator coolant should be checked at the beginning of each day and filled in compliance with the engine manufacturer’s guidelines.
4. Secure the generator for operation.
   a. Skid mounted − the power generating system should be mounted to a smooth, hard surface suitable for supporting the system under all stress conditions.
   b. Trailer mounted − block wheels to prevent accidental movement.

c. Adequate clearance must be provided for access doors to fully open.

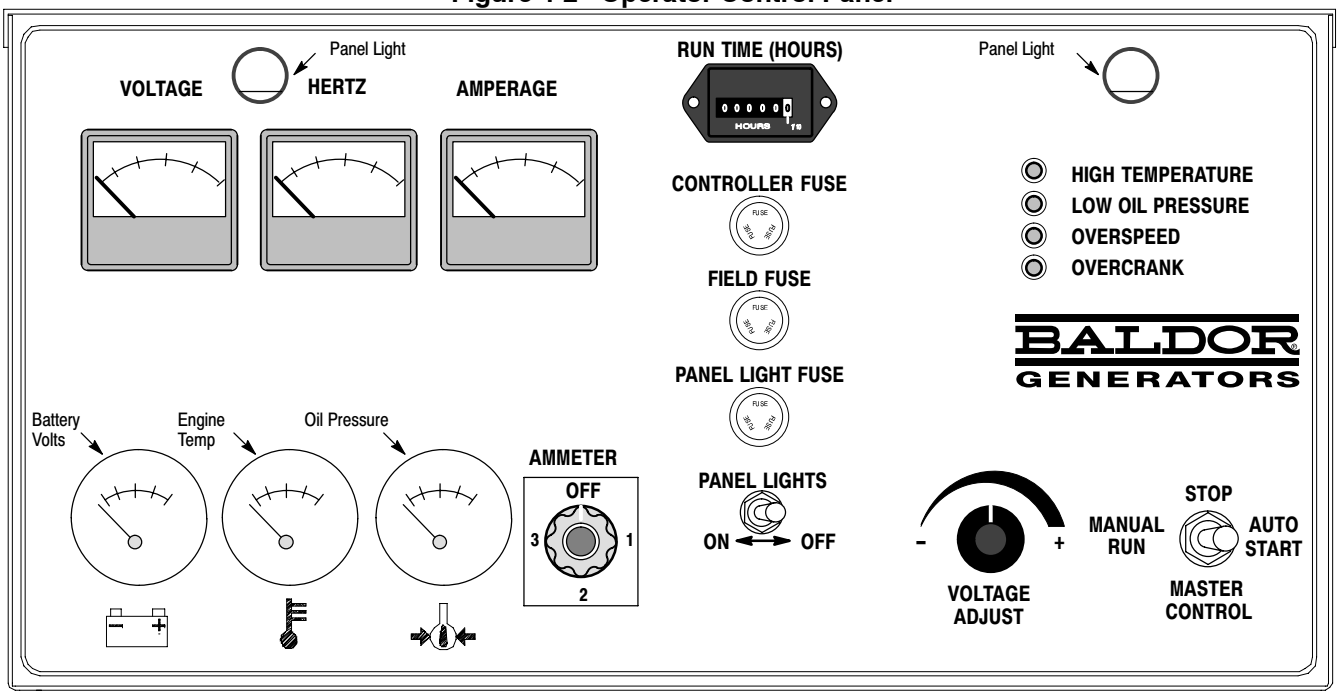
Note: The exhaust also exits radiator end. When positioning a generator system ensure position does not cause a concentration of toxic emissions.

5. Switch the generator set to the applicable voltage setting.
6. Connect the load(s) at the Receptacle panel connections (Figure 4-3).
7. Verify that all electrical cables and wiring are in good condition, no cracked or frayed wires or cable insulation.
8. Ensure that an external ground connection is made when required for safety.

Caution: Large "Engine Compartment Doors" on each side of enclosure must remain closed during operation. If doors remain open, engine will overhead due to restricted air flow.

9. Ensure that Engine Compartment doors are closed for proper ventilation.

Figure 4-2 Operator Control Panel



Panel Lights switch (On-Off)
Turns on two lamps to illuminate the operator panel.

Panel Light Fuse Fuse for panel lights.

Filed Fuse Fuse for generator field.

Controller Fuse Fuse for engine controller.

Master Control switch (Manual Run-Stop - Auto Start)
Manual Run - Starts the engine manually.
Stop - Stops the engine and generator.
Auto Start - Starts the engine from a remote source whenever the utility AC power is lost.

Fault Display Lamps
High Temperature - Indicates excessive engine coolant temperature.
Low Oil Pressure - Indicates low engine oil pressure (<15PSI).
Overspeed - Indicates engine speed is greater than preset limit.
Overcrank - Failure of the engine to start by the end of the crank period results in an "overcrank" shutdown and alarm indication.

Voltage Adjust
Increase or Decrease the Generator output voltage (displayed on VOLTAGE meter)

Voltage meter
Analog display of generator output voltage in RMS volts.

AMMETER switch (3 position)
Off - No current is measured by the Amperage meter.
1 - Phase 1 current is measured by the Amperage meter.
2 - Phase 2 current is measured by the Amperage meter.
3 - Phase 3 current is measured by the Amperage meter.

Amperage meter
Analog display of generator output current in RMS amps.

Hertz meter
Analog display of generator output frequency in Hertz.

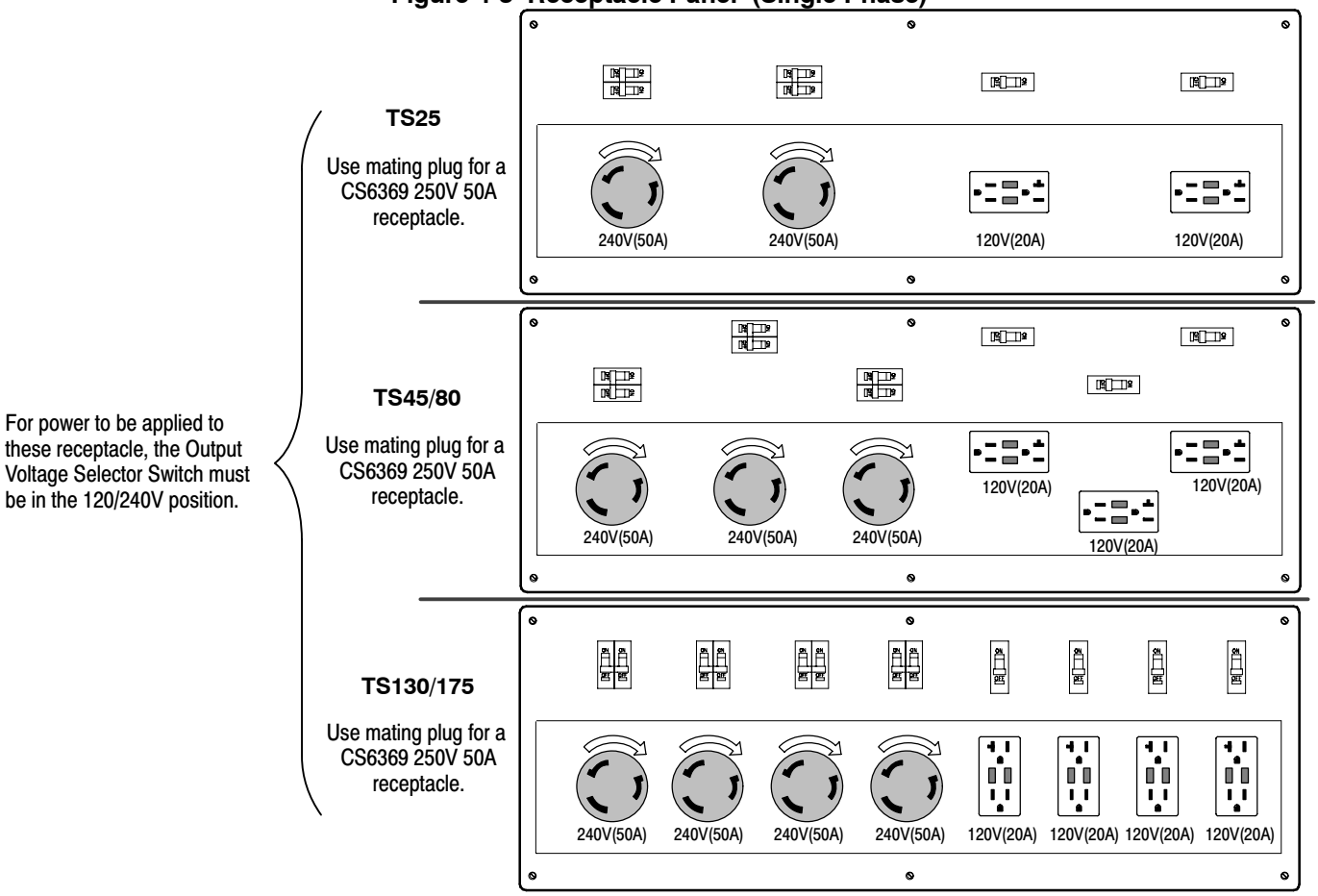
Battery Volts meter
Displays the voltage of the engine starting battery.

Engine Temperature meter
Displays the temperature of the engine coolant.

Oil Pressure meter
Displays engine oil pressure.

Run Time (Hours) meter
Total elapsed time indicator of generator set operation.

Figure 4-3 Receptacle Panel (Single Phase)



Operating Procedures The engine−generator controller is designed to start and stop an engine from either a local ("Manual") or remote ("Automatic") mode. When a start command is issued, the controller issues a run and crank output signal. The controller then monitors engine speed and when crank disconnect speed is reached, the crank signal is terminated. While the engine accelerates to normal speed, the controller continuously monitors the engines speed signal. Should the engine speed exceed the maximum predetermined setpoint, the overspeed shutdown fault circuit will activate, terminating the run signal.

In addition to overspeed shutdown, the engine controller also monitors many other engine protection circuits and should they be activated, the engine will be stopped and/or alarm initiated. The engine will automatically stop for any shutdown condition, or when the remote and/or local start signal is removed. The engine controller operation includes time delay circuits for normal operating conditions such as start delays, cool down and cranking periods.

Manual Start/Stop

First, ensure all "**Pre−start Procedures**" are complete.

To manually Start the Gen−Set, set the Master Control switch to the "Manual Run" position. The following happens:

1. When the "RUN" push−button is pressed, an ENGINE START DELAY timer is initiated. (The start sequence will not be initiated if any shutdown fault condition is present.)
2. When the engine start delay time expires, an engine RUN and CRANK output signal will be initiated. (The RUN output may be programmed to only energize when a start signal is initiated and an engine speed signal is detected.)
3. When the engine starts and begins to accelerate to nominal speed, the controllers speed sensor will terminate the CRANK output when engine speed reaches approximately 20% speed (i.e. CRANK DISCONNECT speed setpoint).

To manually Stop the Gen−Set, set the Master Control switch to the "Stop" position. The controllers RUN output will be immediately terminated which will initiate the engine stop sequence. The engine is locked out and will not run with the Master Control switch in "Stop".

Automatic Start/Stop

First, ensure all "**Pre−start Procedures**" are complete.

To setup the generator for automatic operation, set the Master Control switch to the "Auto Start" position. The following happens:

1. The engine will automatically start upon activation of the remote start contact input. The remote device initiates a start sequence upon contact closure.
2. When the remote start signal is activated, the engine will start as per the sequence of operation described for the manual start sequence.
3. The automatic stop sequence will be initiated by removal of the remote start signal.
4. When the start signal is removed, a cool down delay function will be initiated.
5. When the cool down time delay period expires (typically 5 minutes), the controllers RUN output will be immediately terminated which will initiate the engine to stop.

Automatic Fault Shutdown

When a fault circuit is programmed as a SHUTDOWN, the engine will immediately stop when the fault is activated. A specific shutdown fault can be programmed with a definite time transient delay period that must expire before the shutdown is activated. The stop sequence will cause the controllers RUN output to be immediately terminated which will cause the engine to stop.

"**Low Oil Pressure**" Monitoring of oil pressure begins for a preset time after unit starts and remains in effect until unit is shut down (except as noted in "Loss of Frequency Input"). The LOP signal is derived from an oil pressure switch gauge mounted on the control panel

"**High Temperature**" The engine temperature monitoring begins immediately with the start signal. However, if engine temperature is excessive prior to start (i.e., heat soak after shutdown), the unit is permitted to start. and run for up to 60 seconds. The high temperature condition is permitted to exist for up to 60 seconds after start before shutdown when alarm occurs. If the excessive temperature condition is corrected within the 60 seconds, normal operation continues.

"**Overspeed**"

Over speed protection is provided by a frequency sensing network within the controller. The trip point of the frequency network is adjustable by a rheostat located on the top of the controller at the right hand side. Clockwise (CW) rotation increases the trip frequency and the shutdown speed.

"**Loss of Frequency**" (engine RPM)

Internal protection against loss of frequency input to the cranking disconnect circuit is set after the unit has started normally. If the frequency goes to zero (engine runs out of fuel, frequency signal source fails, etc.) the LOP shutdown circuit is bypassed and a 12 second wait period is initiated. If frequency returns within this time period, LOP monitoring resumes and operation continues normally. If frequency has not returned at the end of this time period, the engine oil pressure status is observed to determine whether the engine is actually running or stopped. If the engine has stopped (i.e., air in fuel, etc.), the cranking cycle will begin in an effort to restart the engine. If the engine has not stopped (loss of input signal, etc.), the unit is shutdown with an "Over crank" indication and alarm.

WARNING: Over crank indication can mean a loss of crank disconnect signal during the previous run period. Attempting to restart the engine with no crank disconnect signal can destroy the starter motor, which can cause serious personal injury.

"**Overcrank**"

The cranking disconnect signal source is a key component in this system and must be checked out thoroughly whenever an Over crank shutdown occurs.

WARNING: Never "jump start" a generator to start the engine. If the battery charge is insufficient to start the engine, charge or replace the battery and try to restart. Jump starting a battery can cause the battery to explode and cause severe injury or death to anyone in the area.

Caution: If a dead battery is suspected, remove the controller fuse, charge battery (or replace), and then attempting starting. Damage to engine control may result from jump starting.

Cranking Control

Over crank Protection

This feature provides a preset crank cycle time period. Failure of the engine to start by the end of the crank period results in an Over crank shutdown and alarm indication.

Cranking Disconnect Adjustment (CDS Adjustment)

The cranking disconnect signal is obtained by a frequency network within the controller. The trip point of the frequency network is not adjustable.

Engine Controller Description

When a fault circuit is programmed as a SHUTDOWN, the engine will immediately stop when the fault is activated. A specific shutdown fault can be programmed with a definite time transient delay period that must expire before the shutdown is activated. The stop sequence will cause the controllers RUN output to be immediately terminated which will cause the engine to stop.

Figure 4-4 ASM160 Analog Engine Controller Connections

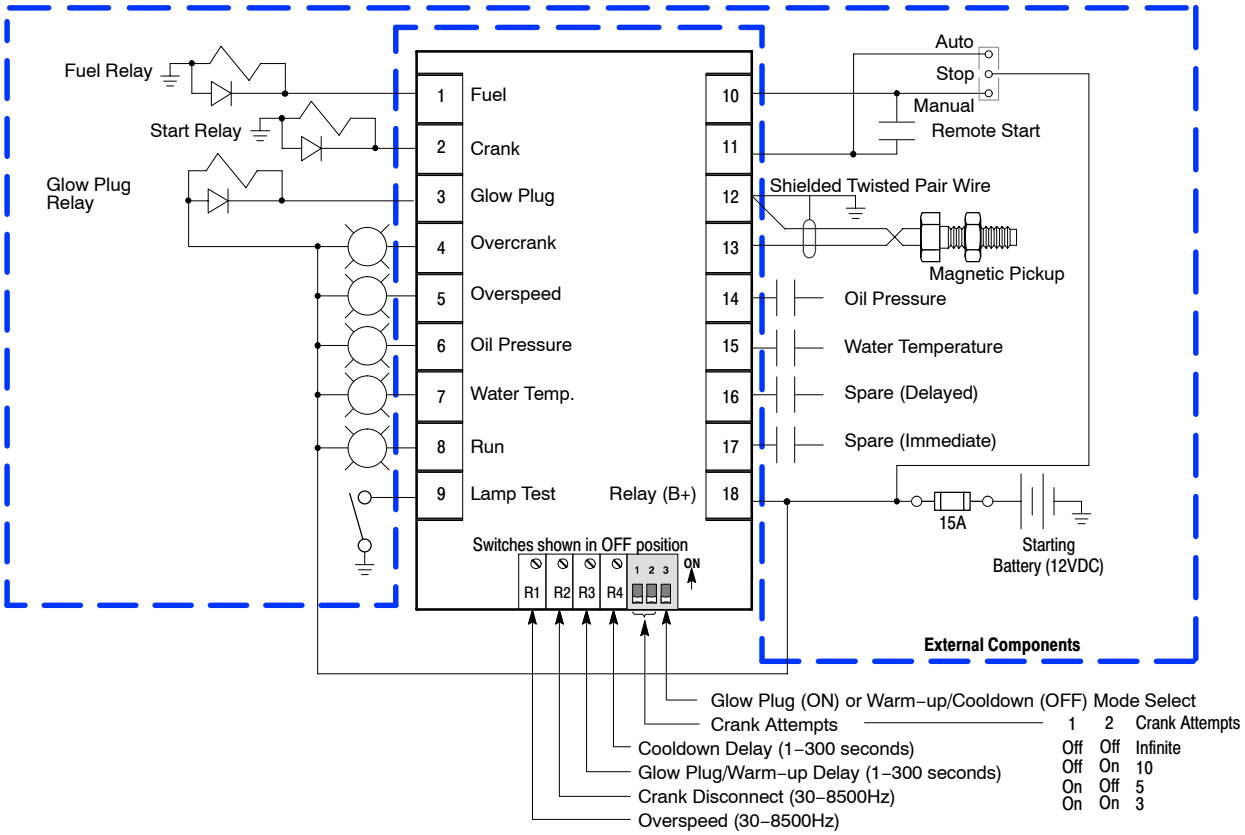


Table 4-2 ASM160 Terminal Description

Pin #	Title	Description
1	Fuel Relay	Output - Drives a pilot relay to Open/Close the fuel valve.
2	Crank Relay	Output - Drives a pilot relay to Open/Close the Starter Relay to crank engine.
3	Glow Plug/At Load	Output - Drives a pilot relay to Open/Close the Glow Plug relay.
4	Overcrank LED	Output - On during Overcrank shutdown (engine fails to start after the number of crank cycles).
5	Overspeed LED	Output - On during Overspeed shutdown (engine's speed has exceeded the overspeed setpoint).
6	Oil Pressure LED	Output - On during Low Oil Pressure shutdown
7	Water Temperature LED	Output - On during High Water Temperature shutdown
8	Run LED	Output - On during normal engine operation
9	Lamp Test (input)	Input - Closed to ground will turn on all LED outputs.
10	Manual Mode	Input - Closed to B+ will initiate a crank cycle (manual mode)
11	Auto Mode	Input - Closed to B+ will initiate a crank cycle (from a remote source, shorts pins 10 and 11 together).
12	Ground	Ground. Battery (-).
13	Magnetic Pickup	Input - Speed input that monitors engine RPM from engine mounted magnetic pickup. (Delayed for engine start).
14	Oil Pressure	Input - Oil Pressure input from sender unit that monitors oil pressure. (Delayed for engine start).
15	Water Temperature	Input - Water Temperature input from sender unit that monitors water temperature. (Delayed for engine start).
16	Spare (delayed)	Input - Extra input for shutdown fault identification and protection. (Delayed for engine start).
17	Spare (Immediate)	Input - Extra input for shutdown fault identification and protection. (Not delayed for engine start)
18	Relay Power (B+)	Input - Battery Voltage (B+).

Adjustments Factory adjustments are correct for most applications. If you choose to change the factory settings, here is the procedure. The potentiometer and switches are shown in Figure 4-4.

Overspeed (30–8500Hz) R1
Sets the RPM at which the engine will be shutdown if the engine speed exceeds this preset value.
To adjust Overspeed value, turn the Overspeed Pot (R1) fully clockwise.
Run the engine up to the maximum operating speed.
Next, slowly turn the Pot (R1) counterclockwise until the engine shuts down on Overspeed.
Now, turn Pot (R1) clockwise two turns. This will adjust the Overspeed setpoint slightly greater.

Crank Disconnect (30–8500Hz) R2
Sets the engine speed (RPM) at which the starter is disengaged.
First, set the throttle at fast idle. Set Pot (R2) fully clockwise. Loosen the crank wire at Terminal #2. Start the engine and immediately disconnect the crank wire (terminal #2) to prevent further cranking.
Slowly turn the Pot (R2) counterclockwise until the green light (Engine Running) turns ON. This adjustment must be complete within 90 seconds, or the engine will shut down indicating Overcrank. (If this happens, simply connect the crank wire (terminal #2), enable starter circuit, manually reset and try again.)

Glow Plug Delay (1 to 300 seconds.) R3 Selected when Switch #3 = On. Disabled when Switch #3 = Off.
Delays engine start to allow glow plugs to heat. When this delay expires, the auto start sequence begins. To increase the setting, turn the Pot (R3) clockwise. To decrease the setting, turn the Pot (R3) counterclockwise.

Warm–up Delay (1 to 300 seconds.) R3
The warm–up delay begins when the engine starts, with the output turning on when delay expires. To increase the setting, turn the Pot (R3) clockwise. To decrease the setting, turn the Pot (R3) counterclockwise.

Cooldown Delay (1 to 300 seconds.) R4. Selected when Switch #3 = OFF. Disabled when Switch #3 = On.
The cooldown delay begins when a stop signal is received. To increase the setting, turn the Pot (R4) clockwise. To decrease the setting, turn the Pot (R4) counterclockwise.

Crank Attempts (Switches 1 and 2)
Allows 3, 5, 10 or infinite number of crank attempts (see Figure 4-4).
If engine fails to start after specified attempts, an Overcrank shutdown condition exists, Overcrank LED On. (Infinite setting disables overcrank shutdown. The engine will do the crank cycle as long as there is sufficient battery power available.)

Engine Controller Operation

Auto Mode Operation

When the controller receives an **automatic start** signal (across pins 10 and 11), the glow plug output turns on (if switch 3=On) and the delay begins. When the glow plug delay expires, the fuel and crank outputs turn on. When the engine starts, the glow plug output is turned off. At this time, the Shutdown Lockout and the Warm−up Time Delay (if selected) will begin, and the starter is disengaged.

The Shutdown Lockout Delay causes the controller to ignore the Oil Pressure, Engine Temperature and Spare Shutdown inputs at engine start up. If the engine false starts before the delay expires, the engine will re−crank after a fixed delay (35 seconds), to let the engine stop moving before engaging the starter. When the delay expires, the Loss of Speed Signal shutdown is armed. Loss of Speed Signal occurs when both Overcrank and Overspeed LED's turn on if the speed drops below the crank disconnect set point.

After the Warm−up delay, the "At Load" output turns on (if selected).
The spare shutdown is armed immediately. There is no LED annunciation for either of the spare shutdowns. They are reset by moving the Manual−Stop−Auto switch to Stop position (disconnecting power) and back to Auto or Manual positions. If engine speed exceeds the Overspeed set point (R1), the controller will turn off the fuel valve, turn on the Overspeed LED, and lockout the engine from any further start attempts.

If a Low Oil Pressure or High Engine Temperature shutdown occurs while the engine is running, the controller will turn off the fuel valve, turn on the appropriate LED and lockout the engine from any further start attempts.

When the controller receives an **automatic stop** signal (remote start contacts open), the "At Load" output turns off, and the Cooldown time delay (if switch 3=Off) will begin. When this delay expires, the controller will turn off the fuel valve to stop the engine.

Manual Mode Operation

When the controller receives an **manual start** signal (pin 10) an automatic start signal is simulated. Controller operation is the same as for Auto Mode all delays and shutdown conditions are the same. Unless a shutdown occurs, the engine will continue to run until the controller receives a manual stop command (by moving the Manual−Stop−Auto switch to Stop position). Manual stop operation is the same as automatic stop operation.

Section 5
Troubleshooting and Maintenance

Maintenance

This manual contains only very minimal engine maintenance instructions. Refer to the engine manufacturer's owner's manual for specific engine maintenance instructions for your generator set. Any maintenance instructions or recommendations in the engine owner's manual take precedence over any of the following general recommendations.

General:

1. Inspect the fuel system for leaks. Replace all defective components immediately.
2. Inspect and replace any fuel line that shows signs of deterioration.
3. Inspect all the fuel clamps to ensure they are tight.
4. Make sure the fuel cap fits snugly on the fuel tank and that the fuel tank contains no leaks.
5. Inspect and clean the battery posts and the associated battery cable terminals.
6. Inspect the external wire cables and connectors used with the generator set for cuts, fraying, or loose connections. Repair or replace any problems prior to using the unit.

Engine:

1. Clean and/or replace any fuel, oil, and/or air filters per the engine manufacturers' guidelines.
2. Check oil level regularly; at least every 5 to 8 operating hours. Maintain the proper oil level.
3. Change the oil as is recommended in the engine manufacturer's owner's manual.
4. Replace the spark plug(s) as is recommended by the engine manufacturer.
5. Clean the cooling fins on the engine to keep the engine's heat dissipation potential at it's maximum.
6. Inspect and clean all governor and carburetor linkages so they operate properly.
7. Inspect the recoil starting rope for any damage and replace it if necessary (if applicable).
8. Clean the trash screen around the recoil starter or other cooling air intake.

Alternator: (also called Generator End)

This generator set must be run at its proper speed to obtain the correct electrical power at its output. All engines have a tendency to slow down when a load is applied to it. The engine governor is designed to hold the operating speed as nearly constant as possible. When the electrical load is increased, the engine is more heavily loaded and engine speed drops slightly. This slight decrease in engine speed results in a slight decrease in generator voltage and frequency output. This voltage and frequency variation has no appreciable effect in the operation of motors, lights, and most appliances and tools. However, timing devices and clocks will not keep perfect time when used on this generator.

1. Clean the generator set and remove any and all dust, dirt, or other foreign material.
2. Inspect and clean the cooling air intake and exhaust louvers of the generator end. Make sure they are clean. Remove dirt or any buildup that may restrict the cooling air flow.
3. Clean the generator set and its components with a damp cloth or sponge. Never use a water hose or pressure washer as this may damage electrical components.
4. Inspect and replace any control panel components that are broken or not working properly (receptacles, circuit breakers, switches, etc.)

Problems and Solutions

Some of the more common problems are listed in Table 5-1. This information is intended to be a check or verification that simple causes can be located and fixed. It is not an exhaustive "how to" for all types of problems. Procedures that require in depth knowledge or skills (like flashing the field) should be referred to the Baldor Generator Service Department by calling (920) 236−4200.

Table 5-1 Troubleshooting Guide

Problem	Possible Cause	Remedy
Engine will not start	No fuel. Restricted air flow. No spark.	Check that fuel valves are ON. Check fuel level in fuel tank. Check/replace air filter. Check/replace spark plug(s). Check that engine switch is in Start position.
Engine will not crank	Dead battery.	Remove battery and trickle charge or replace with new battery. Never Jump Start.
Engine starts but will not run smoothly	Fuel or ignition problem	Refer to engine manual.
Engine overheats	Excessive load Debris or dirt buildup on engine Low Coolant Level	Remove one or more electrical loads. Remove debris. Clean engine surfaces to allow cooling. Replenish coolant
Output voltage varies	Irregular speed (fixed speed mode) Fluctuating speed (fixed speed mode) Loose terminal or load connections Defective bearing (uneven air gap)	Check engine for malfunction or load for fluctuation Stabilize load. The addition of a lamp load (resistance load) may compensate partially for load changes caused by intermittent motor operation. Do not overload. Verify all connections are proper and check tighness torque of terminals. Replace worn bearing
Low Voltage (0−15 VAC output)	Bad Voltmeter Bad/Open Circuit Breaker/Fuse Bad Connection Loss of Residual Magnetism Bad Voltage Selector Switch* Bad Stator Windings	Measure the voltage across the voltage meter with an accurate voltmeter to verify. Check continuity across Breaker/Fuse. Replace if defective. Check wiring including grounds, crimps and connection points. Repair defects. The generator needs to be flashed. Contact Baldor service to perform this procedure. Replace switch, contact Baldor service to perform this procedure. Contact Baldor service to perform this procedure.
Low Voltage (15−20 VAC output)	Bad Voltmeter Incorrect Engine Speed Bad/Open Circuit Breaker/Fuse Bad Connection Bad Voltage Selector Switch* Bad Stator Windings Bad Voltage Adj. Rheostat* Bad Voltage Regulator Bad Rotor Diodes Bad Rotor Windings	Measure the voltage across the voltage meter with an accurate voltmeter to verify. Remove electrical load, output should be 61−62 Hertz adjust engine speed if necessary. Check continuity across Breaker/Fuse. Replace if defective. Check wiring including grounds, crimps and connection points. Repair defects. Replace switch, contact Baldor service to perform this procedure. Contact Baldor service to perform this procedure. Replace rheostat, contact Baldor service to perform this procedure. Replace regulator, contact Baldor service to perform this procedure. Contact Baldor service to perform this procedure. Contact Baldor service to perform this procedure.
Incorrect voltage output	Bad Voltmeter* Incorrect Engine Speed Bad Voltage Adj. Rheostat* Bad Voltage Regulator Bad Connection Bad Voltage Selector Switch*	Measure the voltage across the voltage meter with an accurate voltmeter to verify. Remove electrical load, output should be 61−62 Hertz adjust engine speed if necessary. Replace rheostat, contact Baldor service to perform this procedure. Replace regulator, contact Baldor service to perform this procedure. Check wiring including grounds, crimps and connection points. Repair defects. Replace switch, contact Baldor service to perform this procedure.
High output voltage	Excessive speed (fixed speed mode)	Check engine for malfunction

Table 5-1 Troubleshooting Guide Continued

Problem	Possible Cause	Remedy
Genset will not pull load	Incorrect Engine Speed Load not connected properly Load too large for unit	Remove electrical load, output should be 61-62 Hertz adjust engine speed if necessary. Verify voltage at the load and the connections to the proper receptacle. Verify load amperage is less than the generator set rated. Note: For inductive loads, use the starting amperage rating of the load (not the running amperage rating). Starting amps may be as much as 5 times the running amps.
Electrical shock when frame is touched	Static charge. Grounded armature or field coil.	Ground generator frame at local reference ground (see Section 3). Return to factory for repair
Mechanical noise	Defective bearing Rotor rubbing on stator Loose or misaligned coupling	Replace bearing Bad bearing - replace. Bent shaft - return to factory. Loose end bell - tighten; Loose drive Discs - tighten Tighten; align coupling and alternator shaft to engine shaft.

Service Service for your generator can be obtained from Baldor Generators. Please have the following information available prior to contacting the factory:

The model number and serial number of the generator set.

A complete and accurate description of the problem.

Parts Parts for your generator can be obtained from Baldor Generators. Please have the following information available prior to contacting the factory:

The model number and serial number of the generator set.

A complete and accurate description of the part (part number if known).

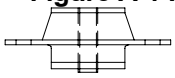
Note: Engine parts can usually be obtained from a local distributor by using the information in the engine manufacturer's owner's manual.

Appendix A
Parts & Wiring Diagrams

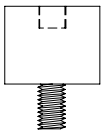
Replacement Parts Replacement parts information is provided in this section of the manual. Engine parts are identified in the engine manual that was provided with your generator set.

IMPORTANT: **Fuses are installed in the control box to protect the engine controller and associated control circuits. When replacing fuses, use the exact replacement fuse (manufacturer and part number).**

Figure A-1 Isolators & Brackets



RM1088A11 (TS25-Green)
RM1088A12 (TS45-Red)
RM1088A25 (TS45-Green)
RM1088A13 (TS80-White)



RM1088A16

Description	Part Number				
	TS25	TS45	TS80	TS130	TS175
SENDER, OIL PRESSURE	EA0001A02	EA0001A02	EA0001A02	EA0001A02	EA0001A02
TEMP SENDER	CT0056A00	CT0055A00	CT0052A00	CT0052A00	EA0001A01
SENDER ADAPTER			CT0053A00	CT0053A00	
GAUGE, FUEL	WD3202A04	WD3202A05	WD3202A05	WD3202A05	WD3202A05
ISOLATOR,	RM1088A11	RM1088A12	RM1088A25	RM1088A18	RM1088A24
ISOLATOR,		RM1088A25			
MUFFLER	EA0008A11	EA0008A13	EA0008A14	EA0008A17	EA0008A21
TANK, COOLANT RECOVERY	TA0000A07	TA0000A07	TA0000A07	TA0000A07	TA0000A07
TANK, FUEL	TA0000A09	TA0000A11	TA0000A11	TA0000A14	TA0000A14
CAP, COOLANT RECOVERY TANK	TA0002A07	TA0002A07	TA0002A07	TA0002A07	TA0002A07
HOSE, RADIATOR	EA0005A04	EA0005A00	EA0005A25	EA0005A10	EA0005A04
HOSE, RADIATOR	EA0005A16	EA0005A02	EA0005A26	EA0005A25	EA0005A16
HOSE, RADIATOR		EA0005A05			
VALVE, FUMOTO			EA0044A00		
VALVE, DRAIN			EA0044A02		
RADIATOR	EA0006A08	EA0006A09	EA0006A09	EA0006A14	EA0006A13
FILTER, AIR	EA0015A12	EA0015A12	EA0015A03	EA0015A05	EA0015A12
FILTER, FUEL	EA0014A02	EA0014A02		EA0014A02	EA0014A02
VALVE,	EA0044A01	EA0044A01	EA0044A01	EA0044A00	EA0044A01
VALVE, FUMOTO	EA0044A05	EA0044A00	EA0044A05	EA0044A05	EA0044A05
MAGNETIC PICK-UP	EA0007A00	EA0007A10	EA0007A00	EA0007A10	EA0007A00
VOLTAGE REGULATOR, AVC63-2.5	EM0027A04	EM0027A04			
C.T. 50:5	CT0050A04				
C.T. 100:5	CT0050A05	CT0050A05			
C.T. 150:5			CT0050A00		
C.T. 200:5		CT0050A01			
C.T. 300:5			CT0050A02		
C.T. 400:5				CT0050A06	CT0050A06
C.T. 600:5				CT0050A03	CT0050A03
DIODE, 1N5408	DI0176A00	DI0176A00	DI0176A00	DI0176A00	DI0176A00
RELAY, OVER-CURRENT	RE5031A00	RE5031A00	RE5031A00	RE5031A00	RE5031A00
RELAY, VF4-45F11	RE5031A01	RE5031A01	RE5031A01	RE5031A01	RE5031A01
RELAY, VF7-41F11	RE5031A09	RE5031A09	RE5031A09	RE5031A09	RE5031A09
SWITCH, LIMIT	SP9090	SP9090	SP9090	SP9090	SP9090
SWITCH	SP9098	SP9098	SP9098	SP9103	SP9103
LAMP	DI0180A01	DI0180A01	DI0180A01	DI0180A00	DI0180A01
LAMP, FIXTURE	DI0180A02	DI0180A02	DI0180A02	DI0179A00	DI0179A02
BREAKER, CIRC, 2P, 70A, 240V, DELAY	CK0078A08				
BREAKER, W/ SHUNT TRIP	CK0070A39	CK0070A40	CK0070A41	CK0070A49	CK0070A45
CONTROLLER, ENGINE	EM0034A00	EM0034A00	EM0034A00	EM0034A00	EM0034A00

Continued on next page

Description	Part No.				
	TS25	TS45	TS80	TS130	TS175
PANEL, RECEPTACLES	EH0353A00	EH0356A00	EH0356A00	EH0395A00	EH0395A00
PANEL, CONTROLS	EH0354A00	EH0354A00	EH0354A00	EH0396A00	EH0396A00
SWITCH, TOGGLE	SP9079	SP9079	SP9079	SP9079	SP9079
SWITCH, DPDT	SP9094	SP9094	SP9094	SP9094	SP9094
SWITCH, 3PH	SP9095	SP9095	SP9095	SP9095	SP9095
KNOB, RHEOSTAT CONTROL	HW2412A00	HW2412A00	HW2412A00	HW2412A00	HW2412A00
RHEOSTAT, 2K OHM, 2W	SP9082	SP9082	SP9082	SP9082	SP9082
GAUGE, PRESSURE	WD3203A00	WD3203A00	WD3203A00	WD3203A00	WD3203A00
GAUGE, TEMP	WD3204A00	WD3204A00	WD3204A00	WD3204A00	WD3204A00
METER, VOLT	WD3201A11	WD3201A11	WD3201A11	WD3201A11	WD3201A11
METER, ETM, 60HZ	WD3201A00	WD3201A00	WD3201A00	WD3201A00	WD3201A00
METER, VOLT, 600ACV	WD3201A18	WD3201A18	WD3201A18	WD3201A18	WD3201A18
METER, AMP,	WD3201A20	WD3201A21	WD3201A22	WD3201A36	WD3201A36
METER, FREQ	WD3201A24	WD3201A24	WD3201A24	WD3201A24	WD3201A24
RECEPTACLE, CS-6369, 250V, 50A,	WD1541A28	WD1541A28	WD1541A28	WD1541A28	WD1541A28
RECEPTACLE, GFI, 250V 20A CSA/NEMA	WD1541A33	WD1541A33	WD1541A33	WD1541A33	WD1541A33
BREAKER, 1 POLE 20 AMP	CK0070A67	CK0070A67	CK0070A67	CK0070A67	CK0070A67
BREAKER, 2 POLE 50A	CK0070A18	CK0070A18	CK0070A18	CK0070A18	CK0070A18
FUSE BUSS, MTH-5	FU0066A00	FU0066A00	FU0066A00	FU0066A00	FU0066A00
FUSE, BUSS, AGC 2	FU0066A03	FU0066A03	FU0066A03	FU0066A03	FU0066A03
FUSE, BUSS, ABC 15	FU0066A05	FU0066A05	FU0066A05	FU0066A05	FU0066A05
DECAL, KEEP HANDS CLEAR	LB0094A01	LB0094A01	LB0094A01	LB0094A01	LB0094A01
DECAL, DANGER-HIGH VOLTAGE	LB0094A11	LB0094A11	LB0094A11	LB0094A11	LB0094A11
DECAL, CAUTION, LOAD STUD DOOR	LB0094A29	LB0094A29	LB0094A29	LB0094A29	LB0094A29
DECAL, WARNING, AUTO START	LB0094A30	LB0094A30	LB0094A30	LB0094A30	LB0094A30
DECAL, VOLTAGE CONNECTION	LB0094A33	LB0094A33	LB0094A33	LB0094A33	LB0094A33
DECAL, BALDOR 22" LOGO	LB0094A61	LB0094A61	LB0094A61	LB0094A61	LB0094A61
DECAL, STRIP W/NUMBER	LB0094A63	LB0099A04	LB0094A63	LB0094A63	LB0094A63
DECAL, DOOR STRIP, (LEFT SIDE)	LB0094A64	LB0094A04	LB0099A06	LB0099A16	LB0099A18
DECAL, LOGO STRIP, (RIGHT SIDE)	LB0094A65	LB0094A05	LB0099A07	LB0099A17	LB0099A19
DECAL, OPERATING INSTRUCTIONS	LB0094A74	LB0094A93	LB0094A93	LB0094A74	LB0094A74
DECAL, 15 SEC. DELAY (SCORED)	LB0094A58	LB0094A58	LB0094A58	LB0094A58	LB0094A58
DECAL, RECEPT PANEL	LB0094A59	LB0094A66	LB0094A59	LB0094B18	LB0094B18
DECAL, CONTROL PANEL	LB0094A60	LB0094A60	LB0094A60	LB0094B17	LB0094B17
PLACARD, "LO"	LB0095A14	LB0095A14	LB0095A14	LB0095A14	LB0095A14
PLACARD, "L1"	LB0095A16	LB0095A16	LB0095A16	LB0095A16	LB0095A16
PLACARD, "L2"	LB0095A17	LB0095A17	LB0095A17	LB0095A17	LB0095A17
PLACARD, "L3"	LB0095A18	LB0095A18	LB0095A18	LB0095A18	LB0095A18
PLACARD, "GROUND"	LB0095A37	LB0095A37	LB0095A37	LB0095A37	LB0095A37
PLACARD, "REMOTE START"	LB0095A42	LB0095A42	LB0095A42	LB0095A42	LB0095A42

Wiring Diagrams Wiring diagrams for these generators are contained on the following pages of this appendix.

Figure A-1 TS25 Connection Diagram

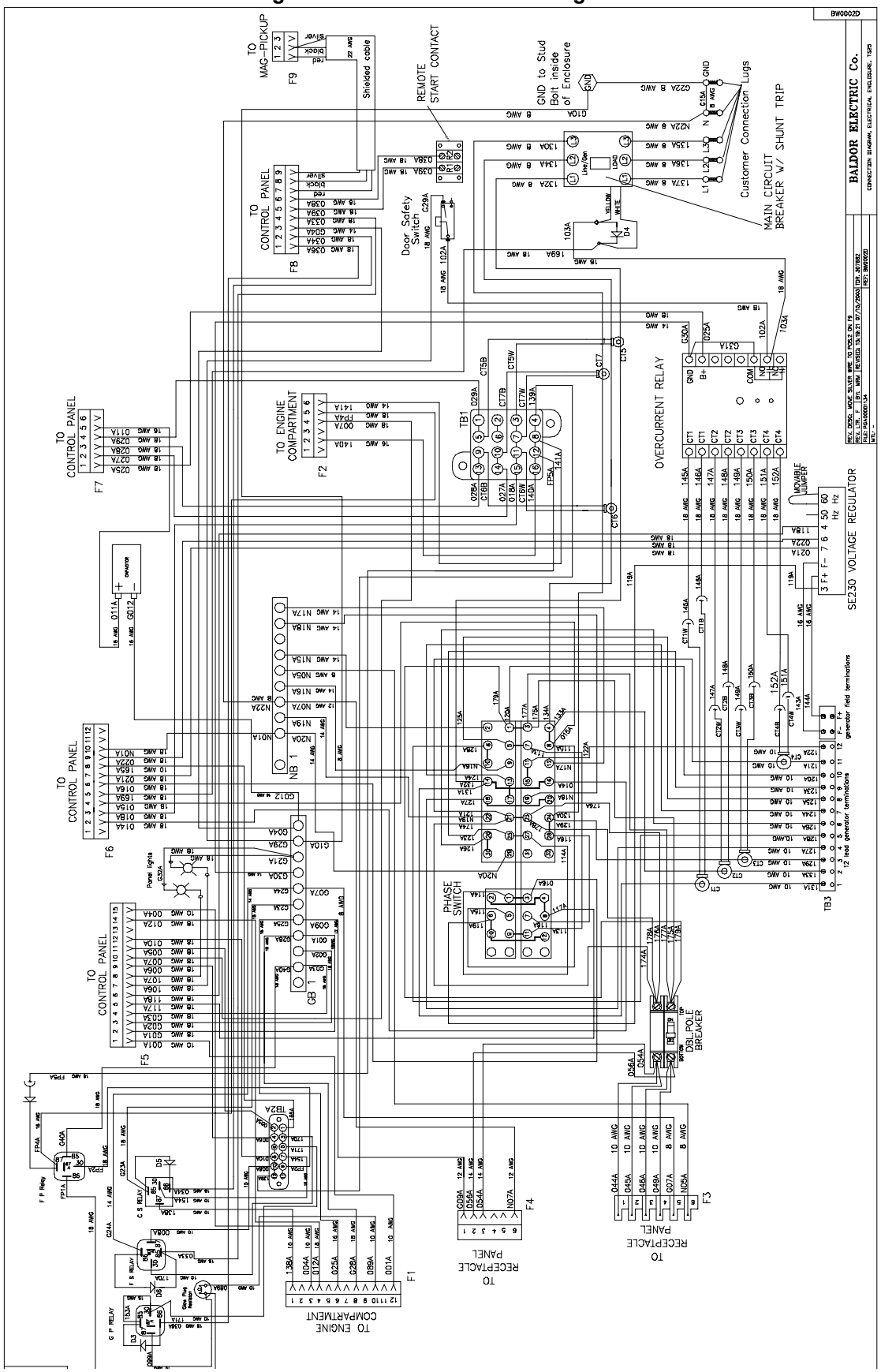


Figure A-2 TS25 Receptacle Connection Diagram

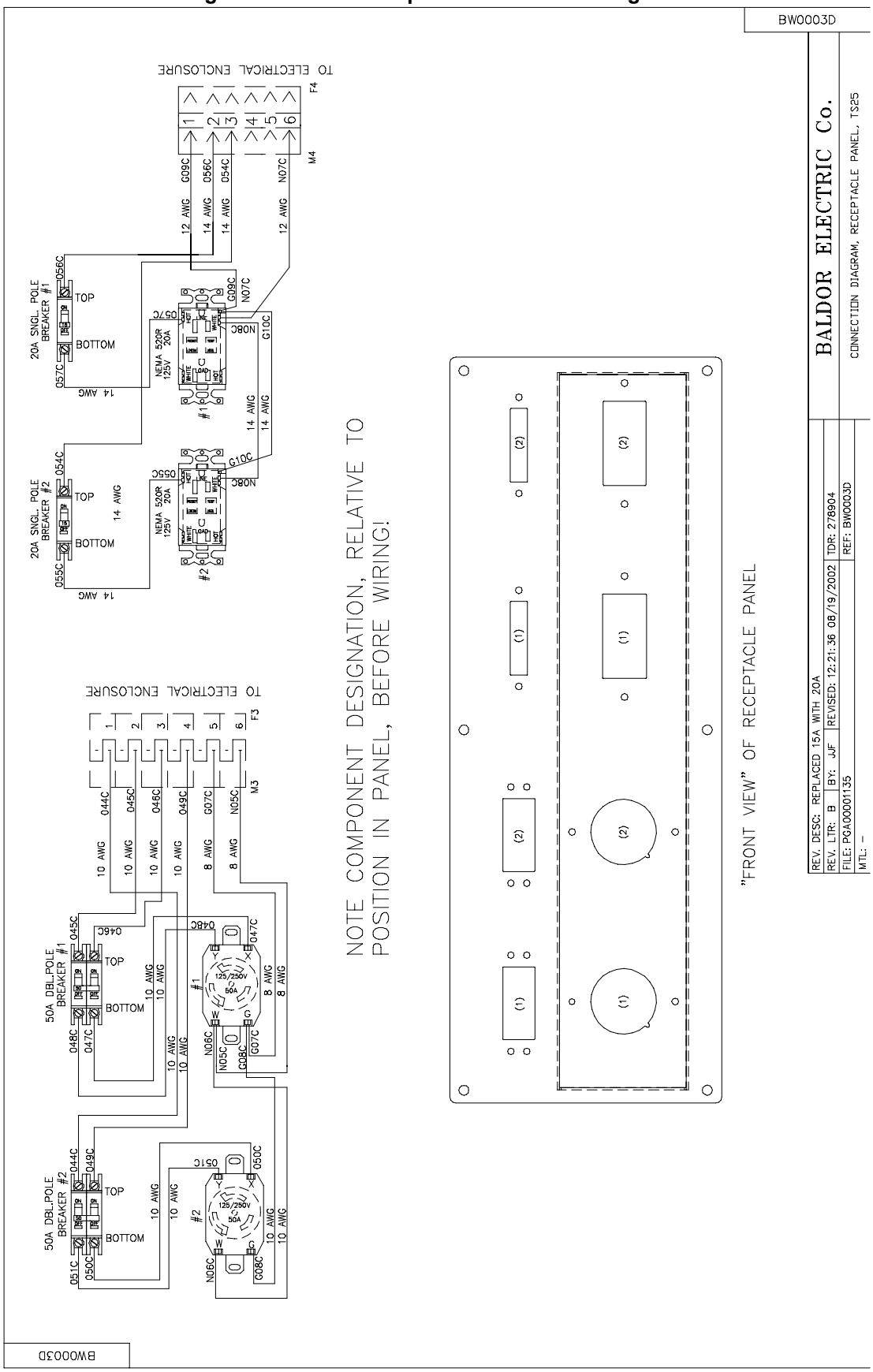


Figure A-3 TS25/45/80 Control Panel Connection Diagram

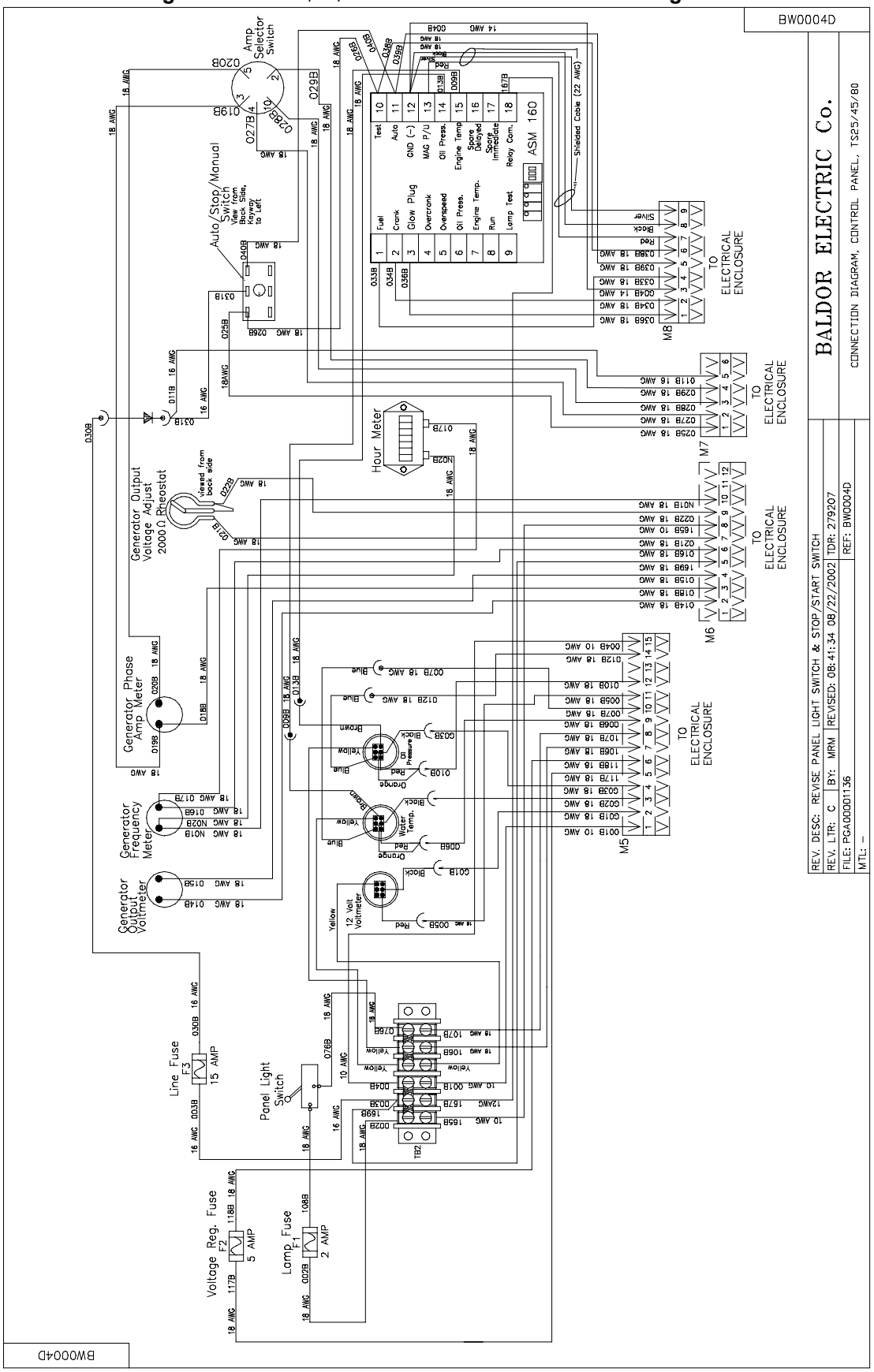


Figure A-4 TS25/45 Generator Lead Connection Diagram

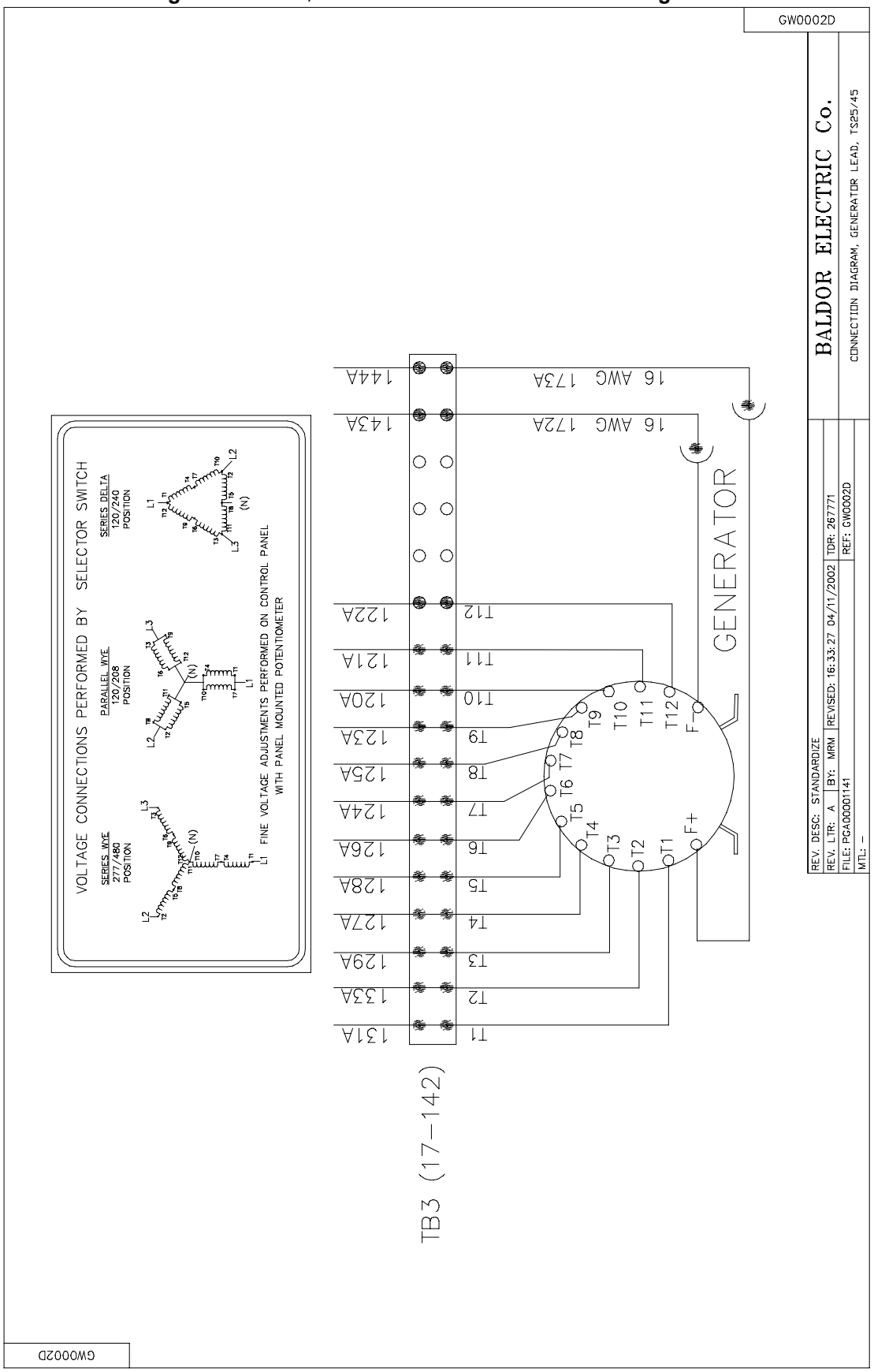


Figure A-5 TS45 Connection Diagram

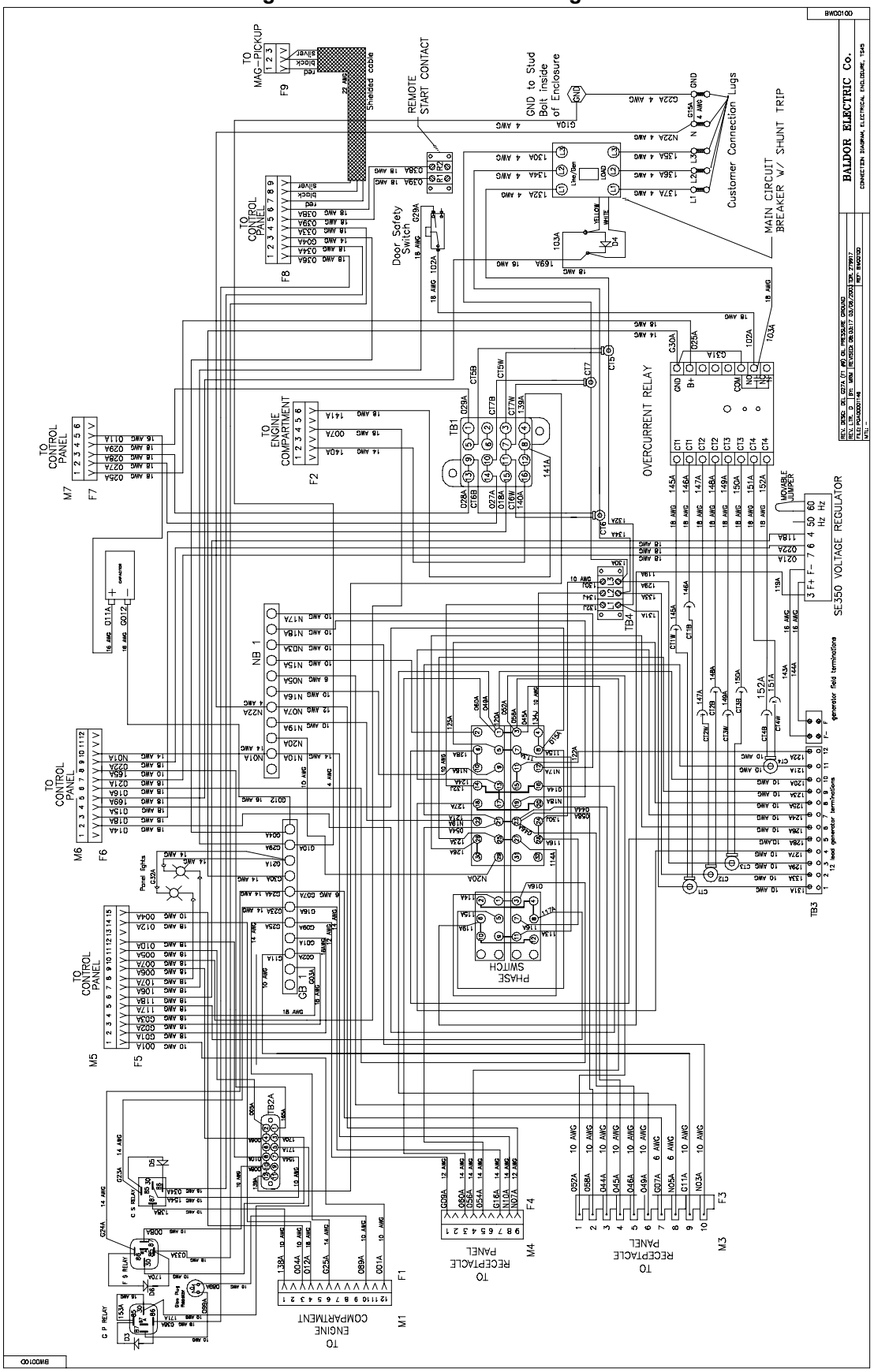


Figure A-6 TS45/80 Receptacle Connection Diagram

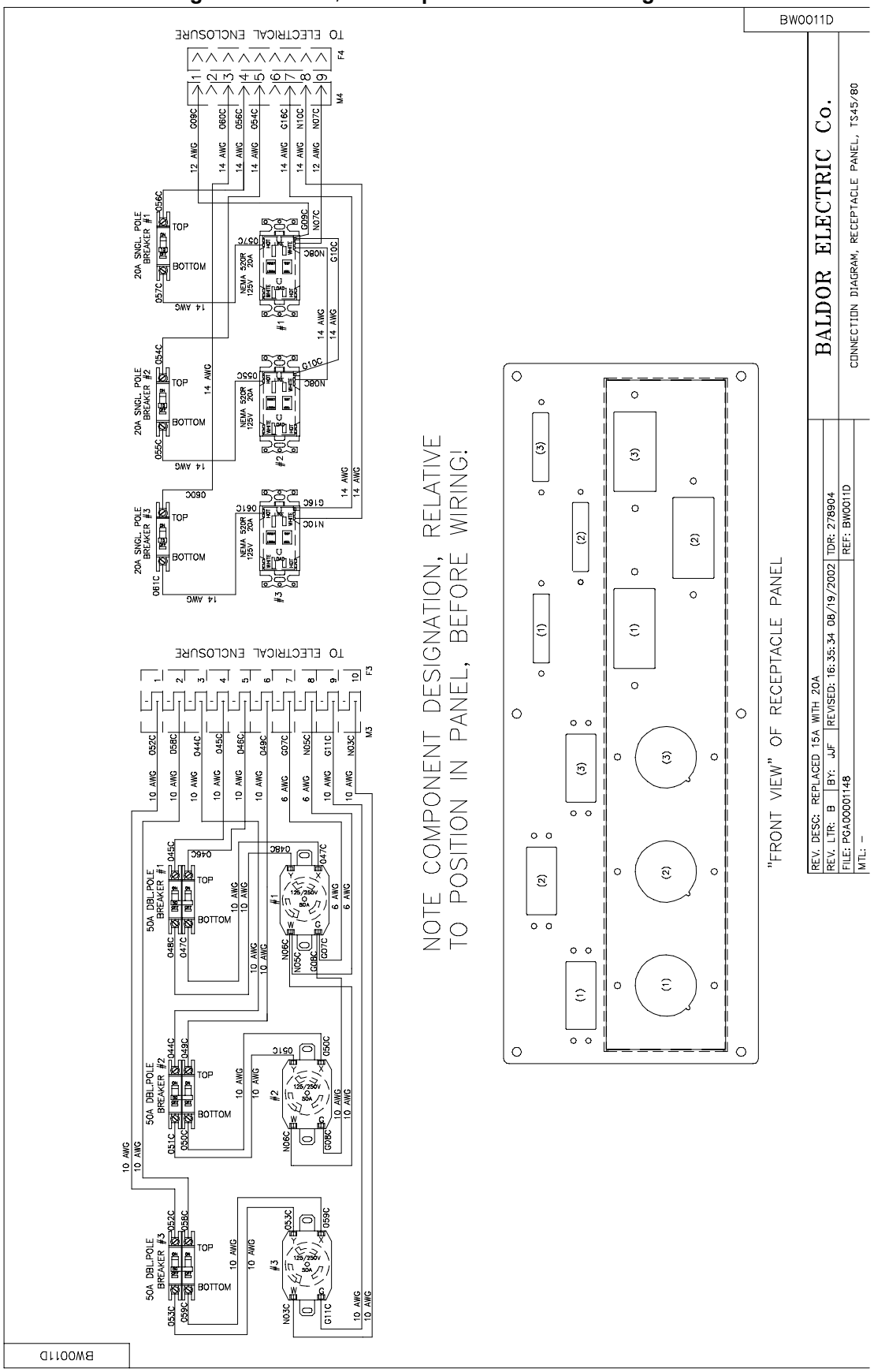


Figure A-7 TS80 Connection Diagram

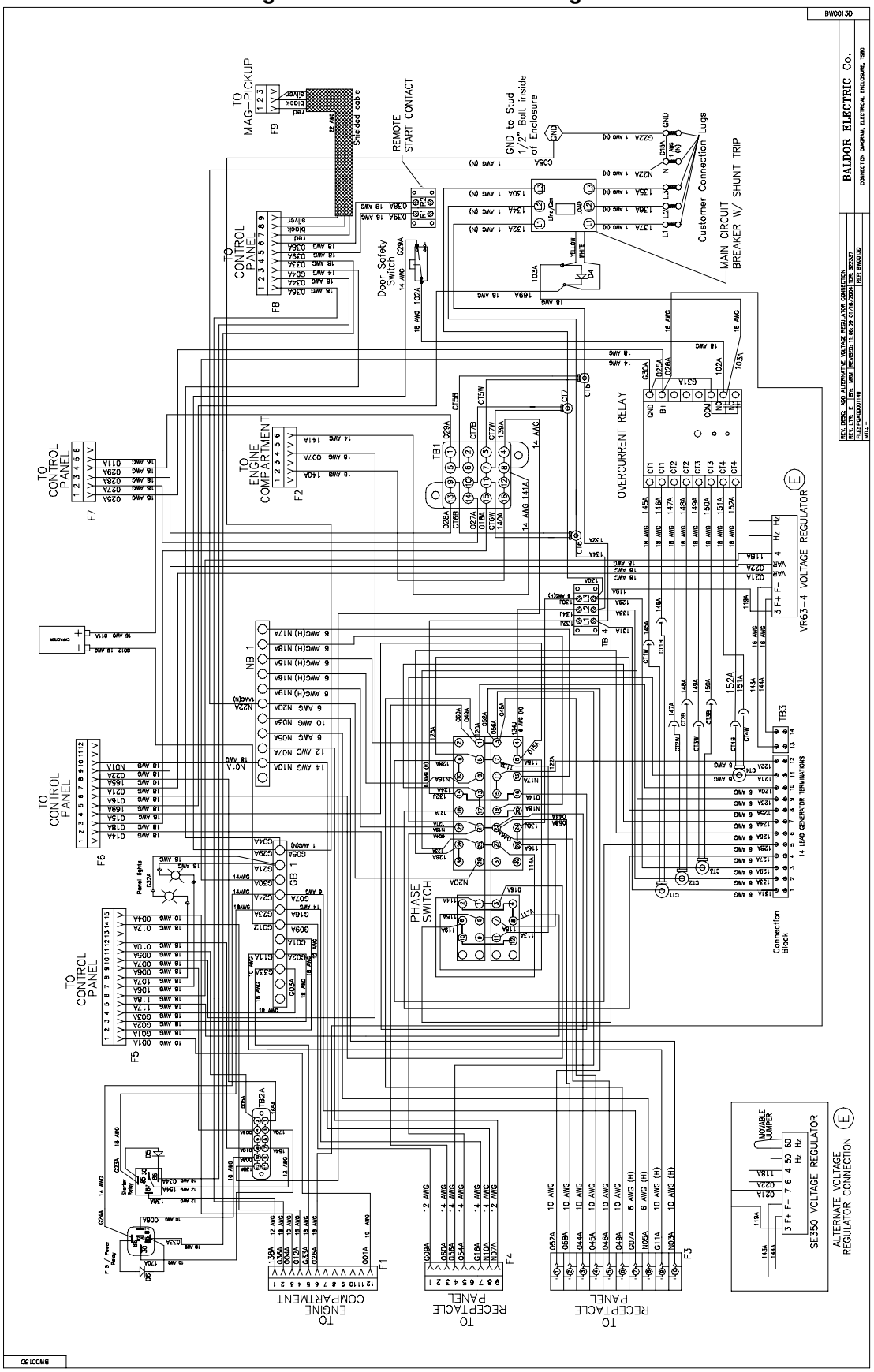


Figure A-8 TS80 Generator Lead Connection Diagram

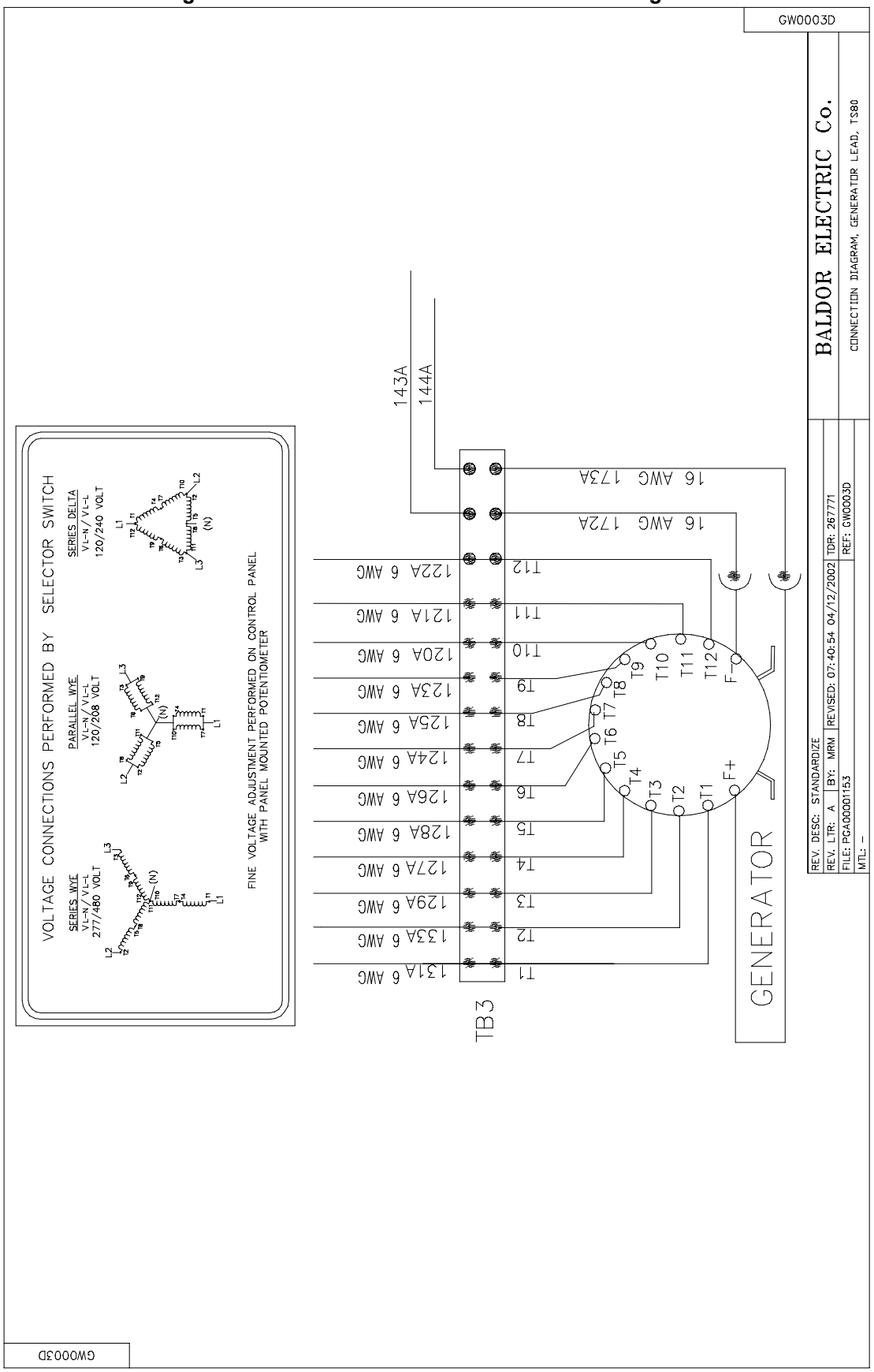


Figure A-9 TS80 Generator Wiring Diagram

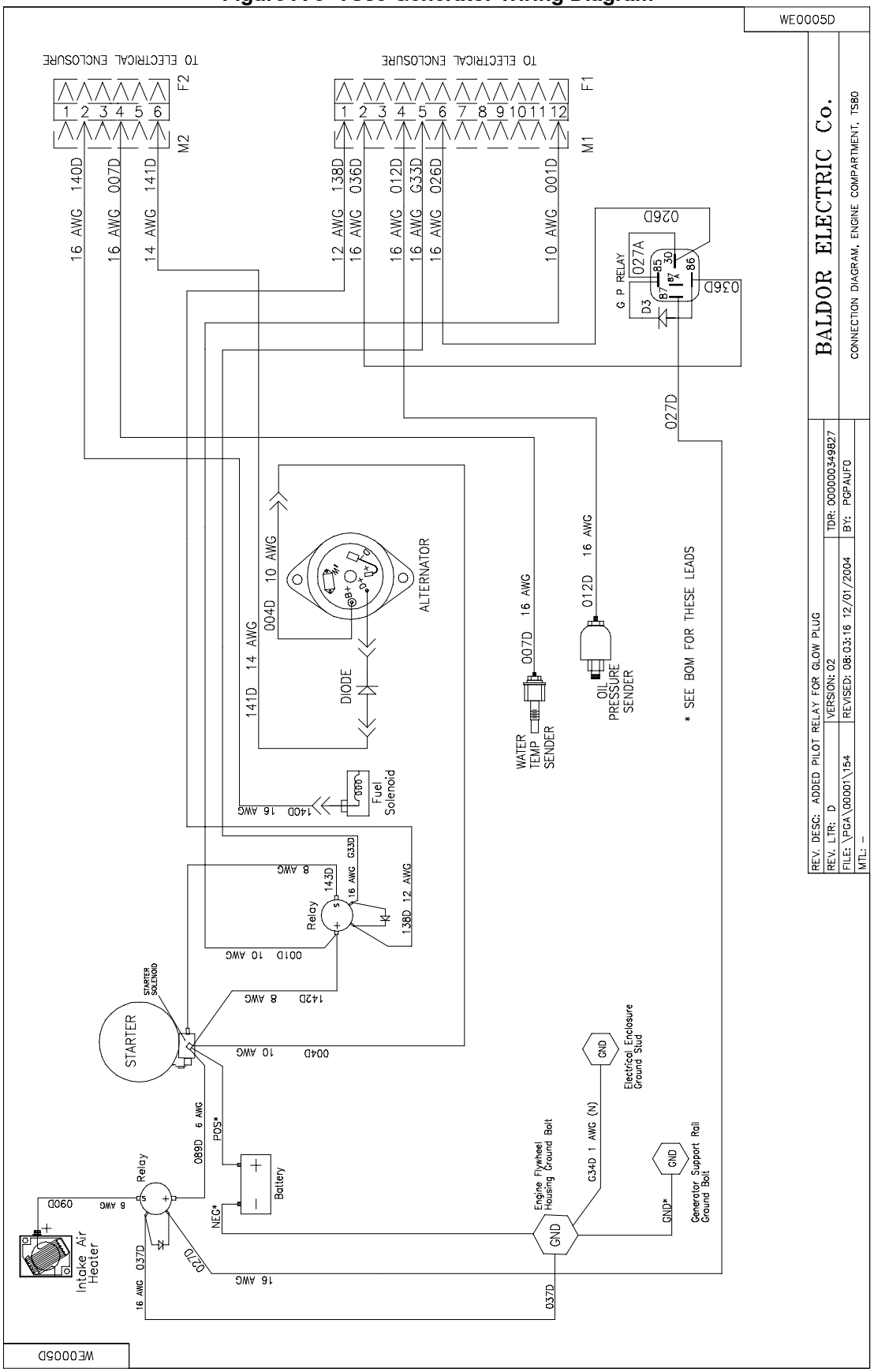


Figure A-10 TS130 Connection Diagram

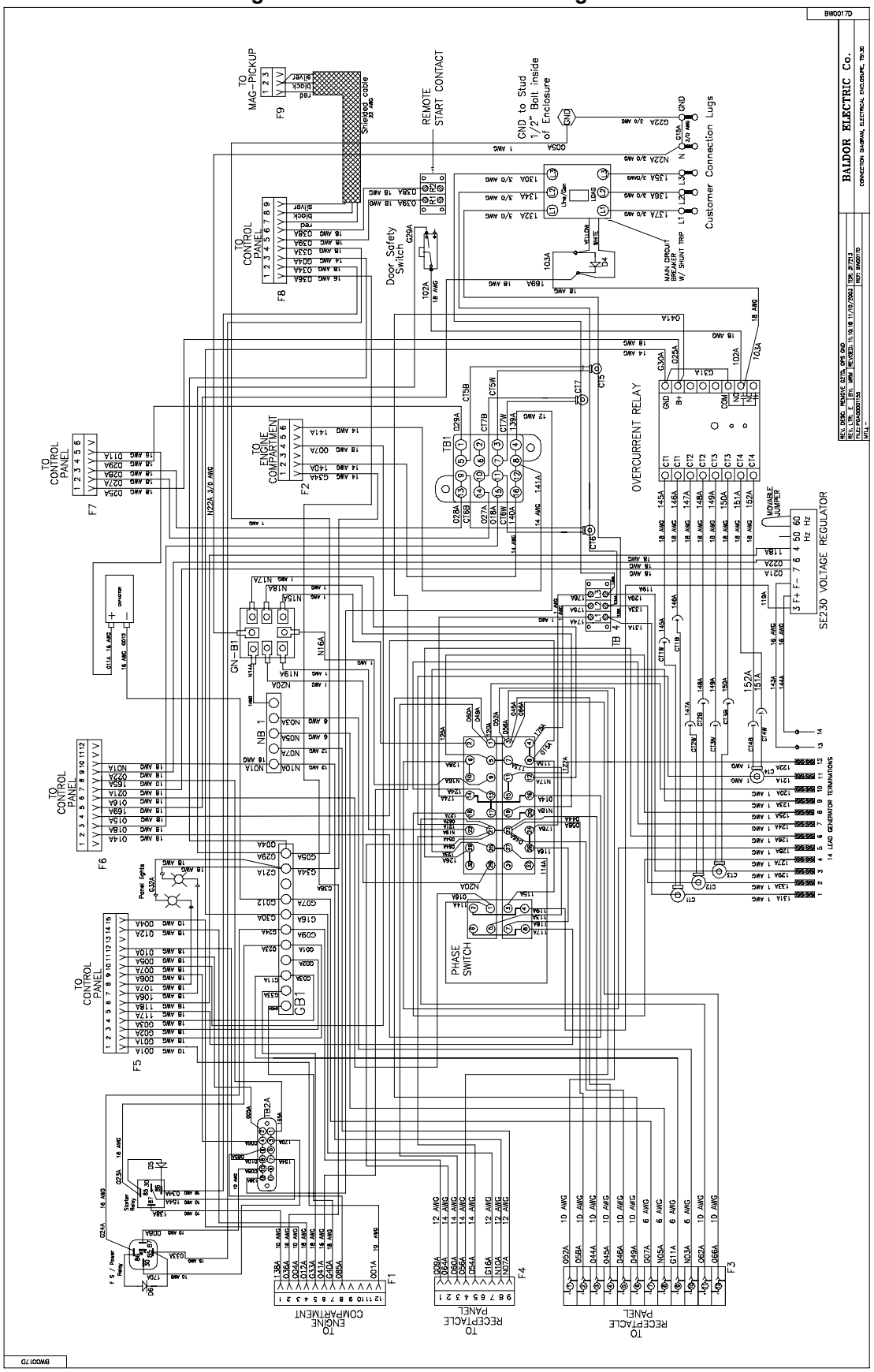


Figure A-11 TS130 Control Panel Connection Diagram

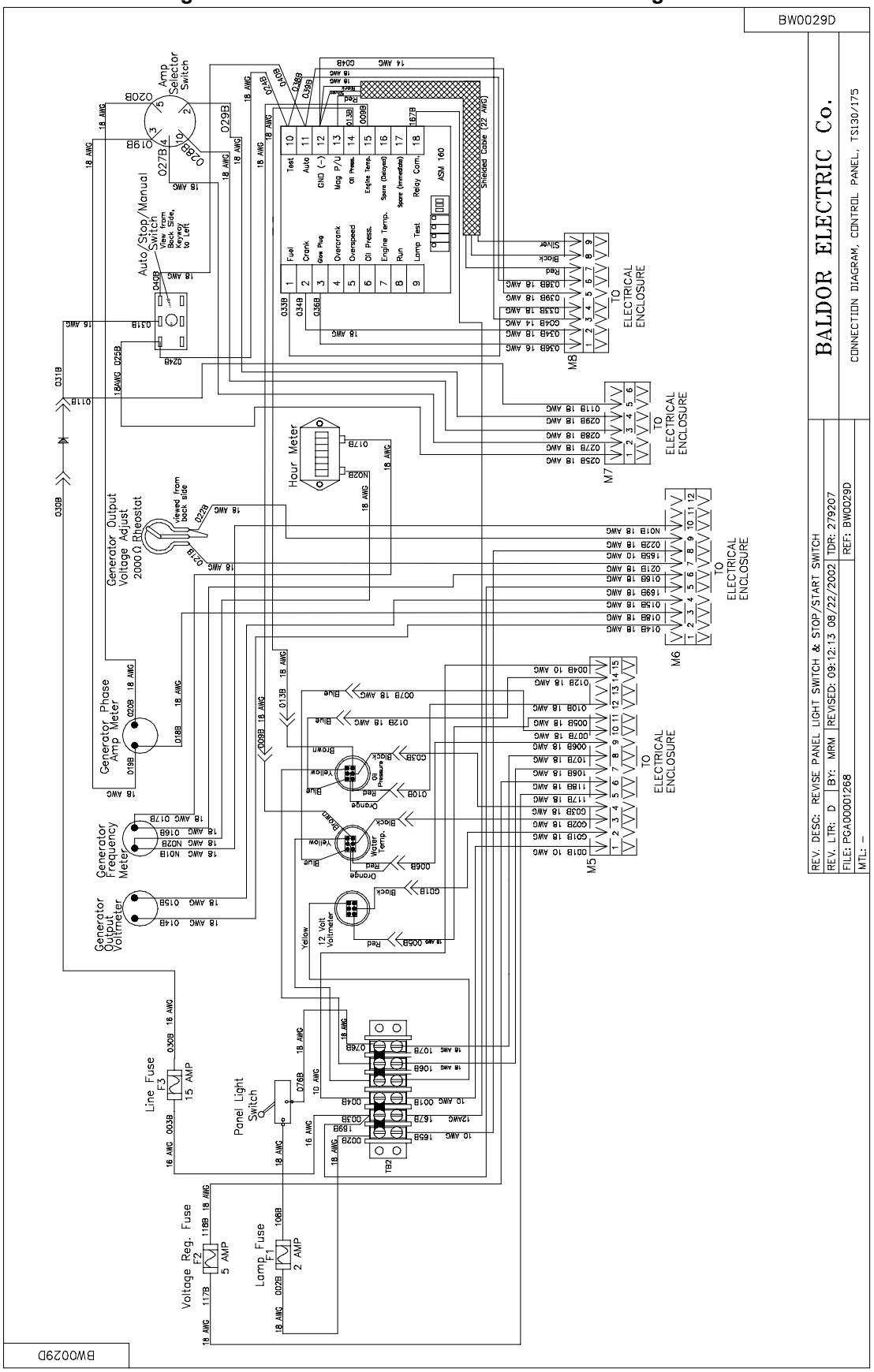


Figure A-12 TS130 Generator Lead Connection Diagram

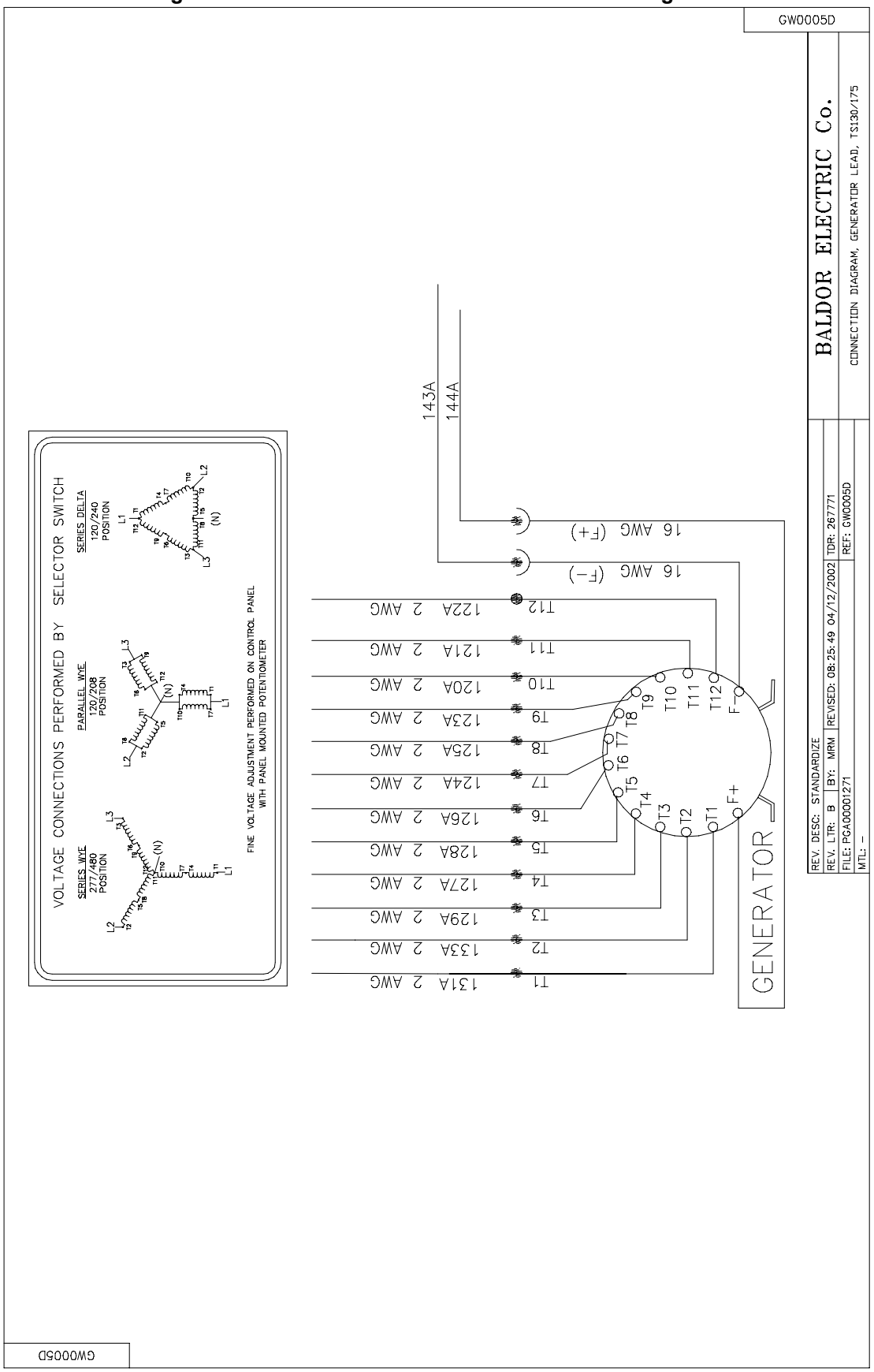


Figure A-13 TS130 Receptacle Connection Diagram

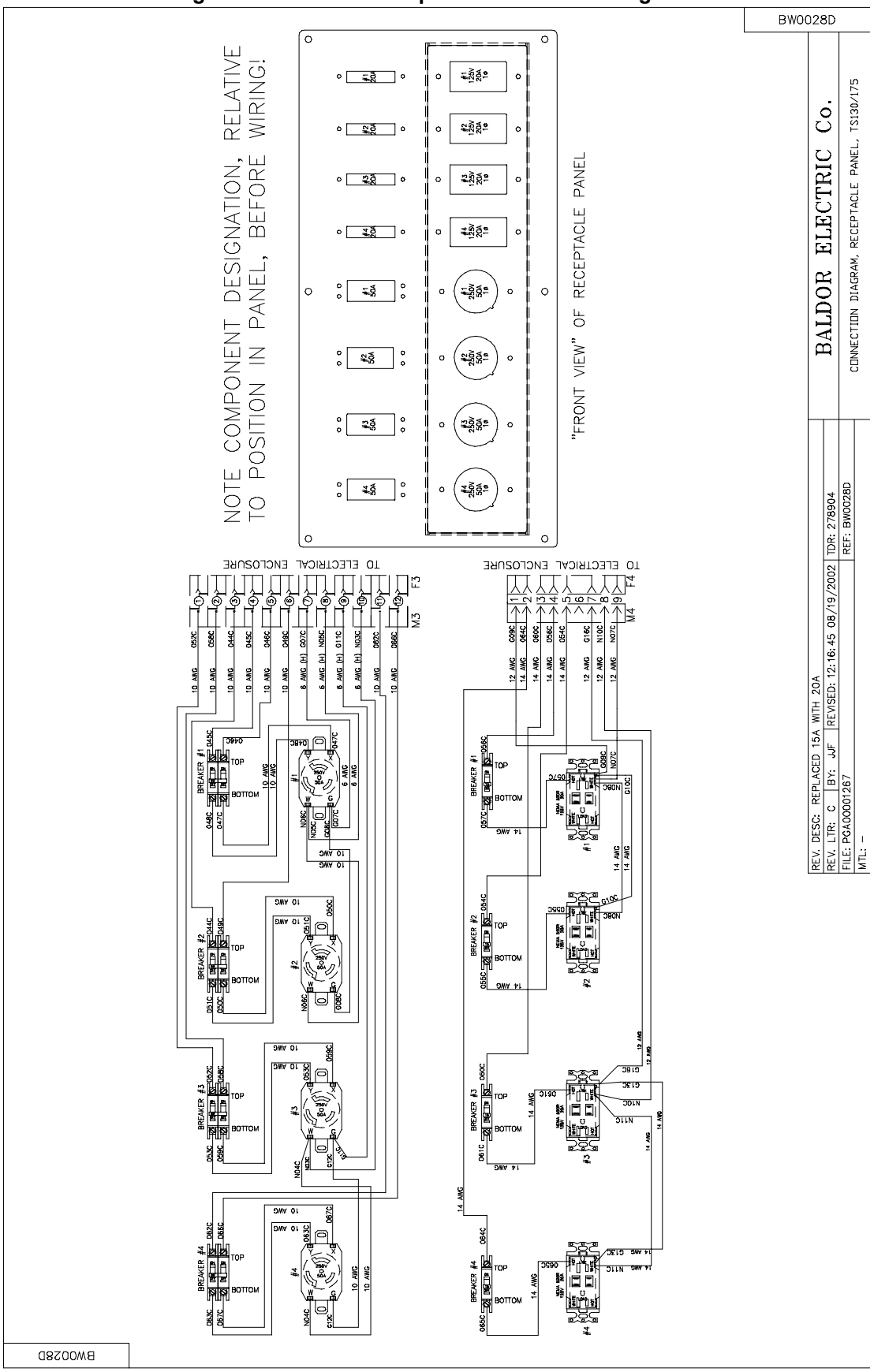


Figure A-14 TS130 Generator Wiring Diagram

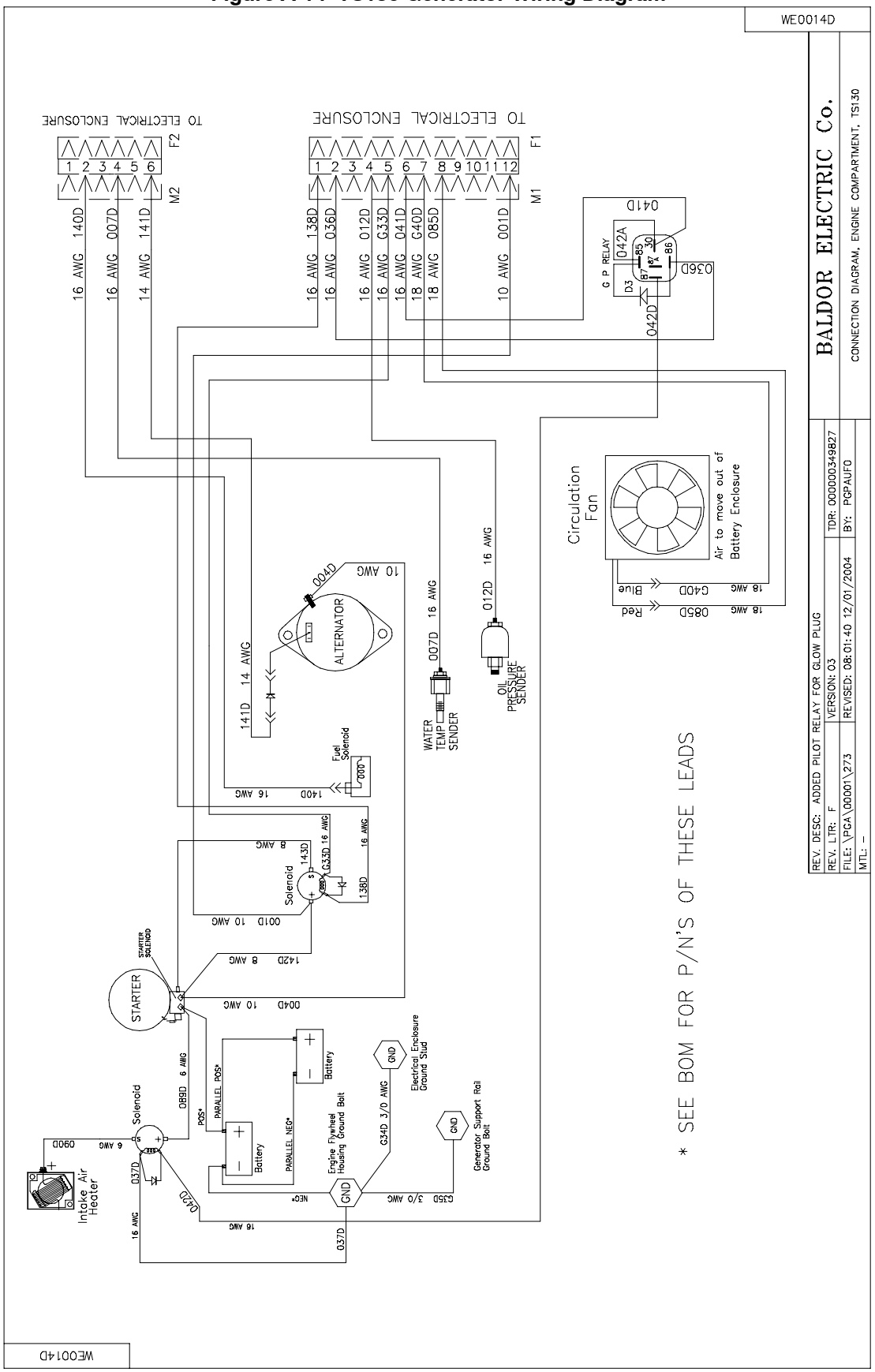


Figure A-15 TS175 Control Panel Connection Diagram

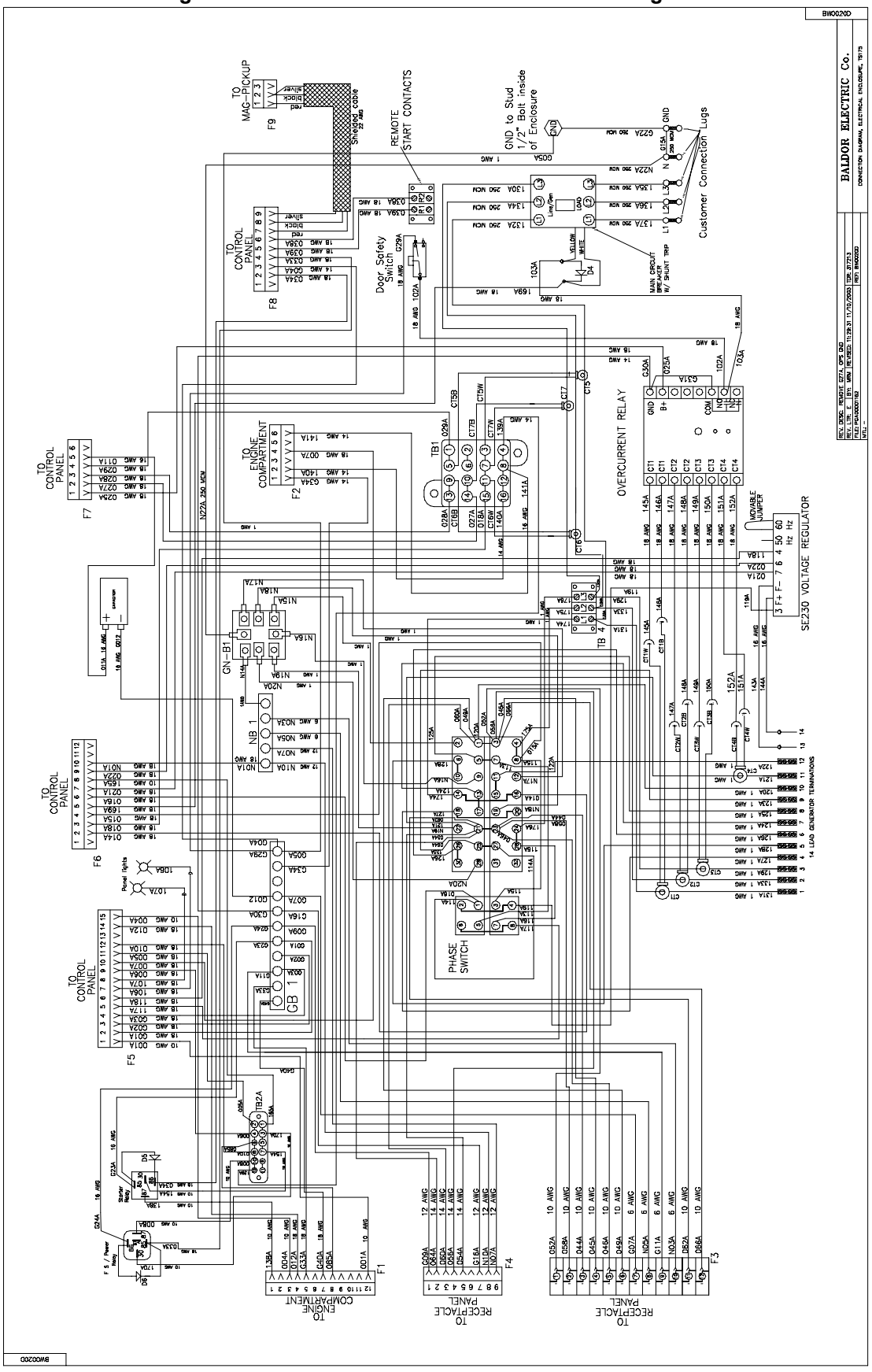
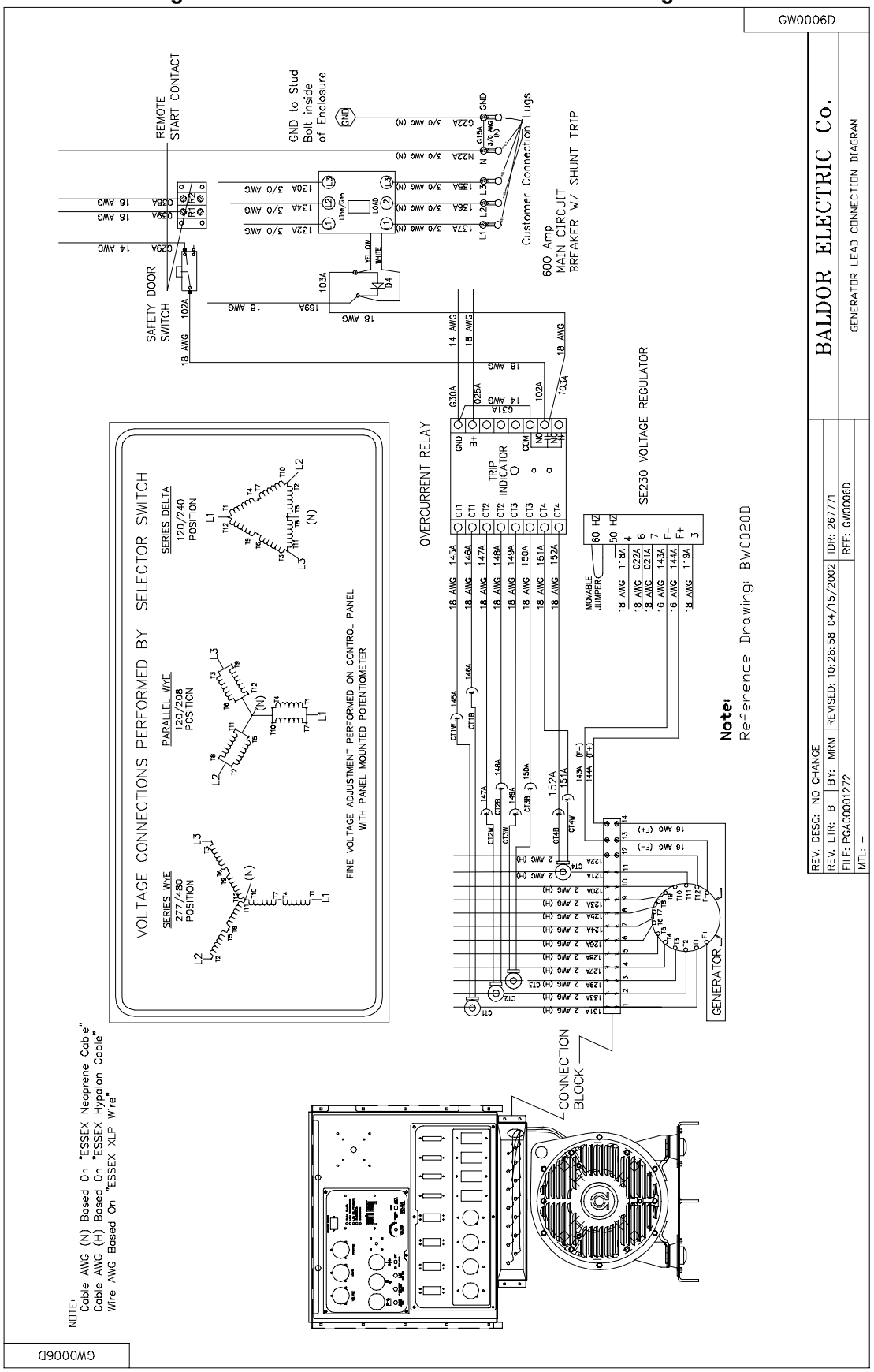


Figure A-16 TS175 Generator Lead Connection Diagram



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